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(FILE 'HOME' ENTERED AT 09:02:17 ON 22 AUG 2006)

FILE 'HCAPLUS' ENTERED AT 09:03:35 ON 22 AUG 2006

E US20060025633/PN

L1 1 SEA ABB=ON PLU=ON US20060025633/PN  
D SCAN  
SEL RN

FILE 'REGISTRY' ENTERED AT 09:04:07 ON 22 AUG 2006

L2 26 SEA ABB=ON PLU=ON (12027-38-2/BI OR 12027-43-9/BI OR  
12411-74-4/BI OR 12501-23-4/BI OR 1314-23-4/BI OR  
1333-74-0/BI OR 1343-93-7/BI OR 1344-28-1/BI OR  
13463-67-7/BI OR 14644-61-2/BI OR 352-93-2/BI OR  
39290-95-4/BI OR 7439-88-5/BI OR 7440-02-0/BI OR  
7440-04-2/BI OR 7440-05-3/BI OR 7440-06-4/BI OR  
7440-16-6/BI OR 7440-18-8/BI OR 7440-44-0/BI OR  
7440-48-4/BI OR 75-08-1/BI OR 7631-86-9/BI OR 7647-10-1  
/BI OR 7783-06-4/BI OR 84973-55-7/BI)

D SCAN

E THIOETHER/CN

L3 2601 SEA ABB=ON PLU=ON B8/PG AND 1/ELC.SUB

L4 1 SEA ABB=ON PLU=ON 7783-06-4/RN

L5 1 SEA ABB=ON PLU=ON 1333-74-0/RN

D SCAN

E H3O40PW12/MF

L6 129 SEA ABB=ON PLU=ON (H(L)O(L)P(L)W)/ELS(L)4/ELC.SUB

L7 58 SEA ABB=ON PLU=ON L6 AND H2O

L8 2 SEA ABB=ON PLU=ON L7 AND L2

D SCAN

L9 45 SEA ABB=ON PLU=ON L7 AND O40PW12

L10 7 SEA ABB=ON PLU=ON L7 AND O62P2W18

D SCAN

L11 72 SEA ABB=ON PLU=ON (H(L)O(L)SI(L)W)/ELS(L)4/ELC.SUB

L12 2 SEA ABB=ON PLU=ON L11 AND L2

D SCAN

L13 51 SEA ABB=ON PLU=ON L11 AND O40SIW12

L14 36 SEA ABB=ON PLU=ON L13 AND H2O

L15 1 SEA ABB=ON PLU=ON 1314-23-4/RN

L16 1 SEA ABB=ON PLU=ON 39290-95-4/RN

D SCAN

D SCAN L15

FILE 'HCAPLUS' ENTERED AT 09:37:50 ON 22 AUG 2006

D SCAN L1

FILE 'REGISTRY' ENTERED AT 09:37:50 ON 22 AUG 2006

L17 1 SEA ABB=ON PLU=ON 7631-86-9/RN

D SCAN

L18 42 SEA ABB=ON PLU=ON (S(L)O(L)ZR)/ELS(L)3/ELC.SUB

L19 14 SEA ABB=ON PLU=ON L18 AND O4S

D SCAN

L20 53 SEA ABB=ON PLU=ON (W(L)O(L)ZR)/ELS(L)3/ELC.SUB

L21 19 SEA ABB=ON PLU=ON L20 NOT AYS/CI

D SCAN

L22 34 SEA ABB=ON PLU=ON L20 NOT L21

FILE 'HCAPLUS' ENTERED AT 09:45:46 ON 22 AUG 2006

L23 26082 SEA ABB=ON PLU=ON MERCAPTAN

L24 146017 SEA ABB=ON PLU=ON MERCAPT?

L25 14375 SEA ABB=ON PLU=ON THIOETHER OR THIO(A)ETHER

D SCAN L1

L26 114741 SEA ABB=ON PLU=ON L4 OR (HYDROGEN OR H2 OR H) (A) (SULP  
HIDE OR SULFIDE OR S) OR H2S

L27 1006379 SEA ABB=ON PLU=ON L3

L28 19 SEA ABB=ON PLU=ON L25 AND L26 AND L27  
 L29 QUE ABB=ON PLU=ON STRONG? (A) ACID?  
 L30 1 SEA ABB=ON PLU=ON L29 AND L28  
 D SCAN  
 L31 1588885 SEA ABB=ON PLU=ON CATALY? OR ACTIVATOR? OR ACCELERANT  
 ? OR ENHANCER? OR ACCELERAT!R?  
 L32 13 SEA ABB=ON PLU=ON L28 AND L31  
 D SCAN TI  
 D SCAN L1  
 L33 8446 SEA ABB=ON PLU=ON L23 (L) PREP?  
 L34 3 SEA ABB=ON PLU=ON L33 AND L28  
 D SCAN  
 L35 8 SEA ABB=ON PLU=ON L28 AND ACID?  
 D SCAN  
 L36 299 SEA ABB=ON PLU=ON (L23 OR L25) AND L26 AND L27  
 L37 2 SEA ABB=ON PLU=ON L36 AND L29  
 D SCAN  
 L38 169 SEA ABB=ON PLU=ON L36 AND L31  
 L39 6 SEA ABB=ON PLU=ON L38 AND L35  
 D SCAN  
 L40 26 SEA ABB=ON PLU=ON L38 AND L33  
 L41 135 SEA ABB=ON PLU=ON L8  
 L42 1467 SEA ABB=ON PLU=ON L12  
 L43 1468 SEA ABB=ON PLU=ON LL41 OR L42  
 L44 1 SEA ABB=ON PLU=ON L28 AND L43  
 D SCAN  
 L45 2 SEA ABB=ON PLU=ON L43 AND L33  
 D SCAN  
 L46 42478 SEA ABB=ON PLU=ON L24 (L) PREP?  
 L47 41 SEA ABB=ON PLU=ON L46 AND (L36 OR L28)  
 L48 26 SEA ABB=ON PLU=ON L47 AND L31  
 D SCAN TI  
 D QUE  
 L49 2 SEA ABB=ON PLU=ON L48 AND L43  
 D SCAN  
 L50 10047 SEA ABB=ON PLU=ON HETEROPOLYACID? OR HETERO(A) POLYACI  
 D? OR HETERO (2A) POLY (2A) ACID? OR HETEROPOLY (A) ACID?  
 L51 1 SEA ABB=ON PLU=ON L50 AND L28  
 D SCAN  
 L52 3 SEA ABB=ON PLU=ON L36 AND L50  
 D SCAN  
 L53 254 SEA ABB=ON PLU=ON L9  
 L54 162 SEA ABB=ON PLU=ON L14  
 L55 355 SEA ABB=ON PLU=ON L53 OR L54  
 L56 1 SEA ABB=ON PLU=ON L28 AND L55  
 D QUE  
 L57 2789 SEA ABB=ON PLU=ON L6  
 L58 1587 SEA ABB=ON PLU=ON L11  
 L59 3582 SEA ABB=ON PLU=ON L57 OR L58  
 L60 1 SEA ABB=ON PLU=ON L28 AND L59  
 D SCAN

FILE 'REGISTRY' ENTERED AT 11:39:35 ON 22 AUG 2006

L61 1 SEA ABB=ON PLU=ON 1344-28-1/RN  
 D SCAN  
 L62 1 SEA ABB=ON PLU=ON 1343-93-7/RN  
 D SCAN  
 L63 1 SEA ABB=ON PLU=ON 12027-38-2/RN  
 D SCAN  
 L64 1 SEA ABB=ON PLU=ON 12027-43-9/RN  
 D SCAN  
 L65 1 SEA ABB=ON PLU=ON 12411-74-4/RN  
 D SCAN  
 E POTASSIUM/CN  
 L66 1 SEA ABB=ON PLU=ON POTASSIUM/CN  
 E RUBIDIUM/CN

L67 1 SEA ABB=ON PLU=ON RUBIDIUM/CN  
 L68 1 SEA ABB=ON PLU=ON RUBIDIN/CN  
     D SCAN  
     D CN  
     E CAESIUM/CN  
     E CESIUM/CN  
 L69 1 SEA ABB=ON PLU=ON CESIUM/CN  
     D SCAN  
     E AMMONIUM/CN  
 L70 1 SEA ABB=ON PLU=ON AMMONIUM/CN  
     D SCAN  
  
 FILE 'HCAPLUS' ENTERED AT 11:50:56 ON 22 AUG 2006  
 L71 QUE ABB=ON PLU=ON L66 OR POTASSIUM  
 L72 QUE ABB=ON PLU=ON L67 OR RUBIDIUM OR L68  
 L73 QUE ABB=ON PLU=ON L69 OR CESIUM  
 L74 QUE ABB=ON PLU=ON L70 OR AMMONIUM  
 L75 126 SEA ABB=ON PLU=ON ((L71 OR L72 OR L73 OR L74) OR K  
     OR RB OR CS OR NH4) (L) L59  
 L76 1 SEA ABB=ON PLU=ON L75 AND L28  
     D SCAN  
     D QUE STAT  
 L77 1 SEA ABB=ON PLU=ON L26 AND L27 AND L76  
 L78 215241 SEA ABB=ON PLU=ON ((L71 OR L72 OR L73 OR L74) OR K  
     OR RB OR CS OR NH4) (2A) (SALT? OR CATION OR ION OR X OR  
     HALOGEN)  
 L79 235 SEA ABB=ON PLU=ON L78 AND L59  
 L80 3 SEA ABB=ON PLU=ON L79 AND ((L23 OR L24 OR L25))  
     D SCAN  
 L81 1 SEA ABB=ON PLU=ON L80 AND L26 AND L27  
 L82 92912 SEA ABB=ON PLU=ON L15  
 L83 90 SEA ABB=ON PLU=ON L19  
 L84 205 SEA ABB=ON PLU=ON L18  
 L85 377 SEA ABB=ON PLU=ON L20  
 L86 57 SEA ABB=ON PLU=ON ((L82 OR L83 OR L84 OR L85)) AND  
     (L28 OR L46)  
 L87 2 SEA ABB=ON PLU=ON ((L82 OR L83 OR L84 OR L85)) AND  
     L28  
     D SCAN  
 L88 23 SEA ABB=ON PLU=ON L59 AND L26  
 L89 5 SEA ABB=ON PLU=ON L88 AND L27  
     D SCAN  
     E ZEOLITE/CT  
 L90 118887 SEA ABB=ON PLU=ON ZEOLIT?  
 L91 48578 SEA ABB=ON PLU=ON CATION? (2A) (RESIN? OR POLYM? OR  
     HOMOPOLY? OR COPOLYM? OR (CO OR TER) (W) POLYM? OR  
     TERPOLYM?)  
 L92 152 SEA ABB=ON PLU=ON (L75 OR L59 OR L79) AND ((L82 OR  
     L83 OR L84 OR L85))  
 L93 1 SEA ABB=ON PLU=ON L92 AND L90 AND L91  
     D SCAN  
 L94 2 SEA ABB=ON PLU=ON L92 AND L26 AND (L24 OR L25)  
     D SCAN  
 L95 23 SEA ABB=ON PLU=ON L30 OR L32 OR (L34 OR L35) OR L37  
     OR L39 OR (L44 OR L45) OR L49 OR (L51 OR L52) OR L56  
     OR L60 OR (L76 OR L77) OR (L80 OR L81) OR L87 OR L89  
     OR L93 OR L94  
     D SCAN TI CC  
 L96 46 SEA ABB=ON PLU=ON L95 OR L40  
 L97 QUE ABB=ON PLU=ON L17 OR SILICA OR SIO2 OR ( SILICON  
     OR SI) (A) (DIOXIDE OR OXIDE OR O2)  
 L98 QUE ABB=ON PLU=ON L61 OR ALUMINA OR AL2O3 OR  
     (ALUMINUM OR ALUMINIUM OR AL) (A) (OXIDE OR O3)  
     D SCAN L1

FILE 'REGISTRY' ENTERED AT 12:30:01 ON 22 AUG 2006

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      E TIO2/MF
L99      18 SEA ABB=ON PLU=ON O2TI/MF
      E CARBON/CN
      E CARBON ACT/CN
      E ACTIVATED CARBON/CN
L100     1 SEA ABB=ON PLU=ON ACTIVATED CARBON/CN
      D SCAN
      E PHOSPHOTUNGSTIC ACID/CN

FILE 'HCAPLUS' ENTERED AT 12:37:38 ON 22 AUG 2006
L101     QUE ABB=ON PLU=ON L99 OR (TITANIUM OR TI) (A) (DIOXIDE
      OR OXIDE OR O2) OR TIO2
L102     QUE ABB=ON PLU=ON L82 OR ZIRCONIA OR (ZIRCONIUM OR
      ZR) (A) (DIOXIDE OR O2 OR OXIDE) OR ZRO2
L103     QUE ABB=ON PLU=ON (L100 OR CARBON OR C OR CHARCOAL) (A
      )ACTIVAT?
L104     12 SEA ABB=ON PLU=ON L96 AND ((L97 OR L98) OR (L101 OR
      L102 OR L103))
      D SCAN
L105     46 SEA ABB=ON PLU=ON L96 OR L104
L106     28 SEA ABB=ON PLU=ON L105 AND (L33 OR L46)
      D SCAN TI
      D SCAN
      D QUE L28
L107     3 SEA ABB=ON PLU=ON L28 AND L106
      D SCAN L1
L108     QUE ABB=ON PLU=ON L5 OR (HYDROGEN OR H2) (A) (ELEMENT?
      OR GAS? OR FEED? OR REACT?)
L109     358 SEA ABB=ON PLU=ON L108 AND L26 AND (L24 OR L25)
      D QUE
L110     9 SEA ABB=ON PLU=ON L105 AND L109
      D SCAN
      D SCAN TI CC
      D SCAN L1
L111     3 SEA ABB=ON PLU=ON L105 AND CLEAV?
      D SCAN
L112     QUE ABB=ON PLU=ON (L105 OR L106 OR L107) OR L110 OR
      L111
L113     7 SEA ABB=ON PLU=ON L112 AND 23/SC,SX
L114     10 SEA ABB=ON PLU=ON L112 AND 45/SC,SX
L115     9 SEA ABB=ON PLU=ON L112 AND 67/SC,SX
L116     18 SEA ABB=ON PLU=ON (L113 OR L114 OR L115)
L117     4 SEA ABB=ON PLU=ON L28 AND L108
      D SCAN
L118     28 SEA ABB=ON PLU=ON ((L112 OR L113 OR L114 OR L115 OR
      L116 OR L117)) AND L46
L119     6 SEA ABB=ON PLU=ON L118 AND L108 AND L26 AND L27
      D SCAN
      D QUE L46
L120     27252 SEA ABB=ON PLU=ON L24 (3A) (PRODUC? OR PROD# OR
      GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR
      FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR
      FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
L121     11 SEA ABB=ON PLU=ON L120 AND L118
      D SCAN
      D SCAN TI CC
L122     26589 SEA ABB=ON PLU=ON ?MERCAP? (2A) (PRODUC? OR PROD# OR
      GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR
      FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR
      FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)
L123     11 SEA ABB=ON PLU=ON L122 AND (L121 OR L105)
      D SCAN TI
L124     32494 SEA ABB=ON PLU=ON ?THIOL? (2A) (PRODUC? OR PROD# OR
      GENERAT? OR MANUF? OR MFR# OR CREAT? OR FORM## OR
      FORMING# OR FORMAT? OR MAKE# OR MADE# OR MAKIN# OR
      FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)

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L125 12 SEA ABB=ON PLU=ON L124 AND L105  
 D SCAN TI  
 L126 19 SEA ABB=ON PLU=ON L117 OR L119 OR L121 OR L123 OR  
 L125  
 D SCAN TI CC  
 L127 QUE ABB=ON PLU=ON 6/SC,SX  
 L128 QUE ABB=ON PLU=ON 59/SC,SX  
 L129 17 SEA ABB=ON PLU=ON L126 NOT (L127 OR L128)  
 L130 15 SEA ABB=ON PLU=ON L129 NOT FUEL?/SC,SX  
 L131 15 SEA ABB=ON PLU=ON L130 AND (L96 OR (L104 OR L105 OR  
 L106 OR L107) OR (L110 OR L111 OR L112 OR L113 OR L114  
 OR L115 OR L116 OR L117 OR L118 OR L119) OR L121 OR  
 L123 OR L125 OR L126 OR L129)  
 D SCAN  
 L132 3 SEA ABB=ON PLU=ON L131 AND L59  
 D SCAN  
 L133 2 SEA ABB=ON PLU=ON L131 AND L50  
 L134 3 SEA ABB=ON PLU=ON L132 OR L133  
 D SCAN  
 D L134 1-3 HITSTR

FILE 'REGISTRY' ENTERED AT 13:53:33 ON 22 AUG 2006

D SCAN L61  
 D SCAN L62  
 D SCAN L63  
 D SCAN L64  
 D SCAN L65  
 D SCAN L66

FILE 'HCAPLUS' ENTERED AT 13:54:43 ON 22 AUG 2006

L135 2413 SEA ABB=ON PLU=ON L62  
 L136 1375 SEA ABB=ON PLU=ON L63  
 L137 97 SEA ABB=ON PLU=ON L64  
 L138 115 SEA ABB=ON PLU=ON L65  
 L139 3 SEA ABB=ON PLU=ON L131 AND ((L135 OR L136 OR L137 OR  
 L138))  
 L140 1 SEA ABB=ON PLU=ON L55 AND L131  
 D SCAN  
 L141 1 SEA ABB=ON PLU=ON L55 AND L105  
 L142 3 SEA ABB=ON PLU=ON (L139 OR L140 OR L141)  
 L143 3 SEA ABB=ON PLU=ON L142 AND L134  
 L144 12 SEA ABB=ON PLU=ON L131 NOT L143

=> => d que stat l143

L2 26 SEA FILE=REGISTRY ABB=ON PLU=ON (12027-38-2/BI OR  
 12027-43-9/BI OR 12411-74-4/BI OR 12501-23-4/BI OR  
 1314-23-4/BI OR 1333-74-0/BI OR 1343-93-7/BI OR  
 1344-28-1/BI OR 13463-67-7/BI OR 14644-61-2/BI OR  
 352-93-2/BI OR 39290-95-4/BI OR 7439-88-5/BI OR  
 7440-02-0/BI OR 7440-04-2/BI OR 7440-05-3/BI OR  
 7440-06-4/BI OR 7440-16-6/BI OR 7440-18-8/BI OR  
 7440-44-0/BI OR 7440-48-4/BI OR 75-08-1/BI OR 7631-86-9  
 /BI OR 7647-10-1/BI OR 7783-06-4/BI OR 84973-55-7/BI)  
 L3 2601 SEA FILE=REGISTRY ABB=ON PLU=ON B8/PG AND 1/ELC.SUB  
 L4 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7783-06-4/RN  
 L5 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1333-74-0/RN  
 L6 129 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)P(L)W)/ELS(L  
 )4/ELC.SUB  
 L7 58 SEA FILE=REGISTRY ABB=ON PLU=ON L6 AND H2O  
 L9 45 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND O40PW12  
 L11 72 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)SI(L)W)/ELS(L  
 )4/ELC.SUB  
 L12 2 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND L2  
 L13 51 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND O40SIW12

L14 36 SEA FILE=REGISTRY ABB=ON PLU=ON L13 AND H2O  
 L15 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1314-23-4/RN  
 L17 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7631-86-9/RN  
 L18 42 SEA FILE=REGISTRY ABB=ON PLU=ON (S(L)O(L)ZR)/ELS(L)3/  
 ELC.SUB  
 L19 14 SEA FILE=REGISTRY ABB=ON PLU=ON L18 AND O4S  
 L20 53 SEA FILE=REGISTRY ABB=ON PLU=ON (W(L)O(L)ZR)/ELS(L)3/  
 ELC.SUB  
 L23 26082 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPTAN  
 L24 146017 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPT?  
 L25 14375 SEA FILE=HCAPLUS ABB=ON PLU=ON THIOETHER OR THIO(A)ET  
 HER  
 L26 114741 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR (HYDROGEN OR H2  
 OR H) (A) (SULPHIDE OR SULFIDE OR S) OR H2S  
 L27 1006379 SEA FILE=HCAPLUS ABB=ON PLU=ON L3  
 L28 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L25 AND L26 AND L27  
 L29 QUE ABB=ON PLU=ON STRONG? (A)ACID?  
 L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L28  
 L31 1588885 SEA FILE=HCAPLUS ABB=ON PLU=ON CATALY? OR ACTIVATOR?  
 OR ACCELERANT? OR ENHANCER? OR ACCELERAT!R?  
 L32 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L31  
 L33 8446 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 (L) PREP?  
 L34 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L33 AND L28  
 L35 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND ACID?  
 L36 299 SEA FILE=HCAPLUS ABB=ON PLU=ON (L23 OR L25) AND L26  
 AND L27  
 L37 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L29  
 L38 169 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L31  
 L39 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L38 AND L35  
 L40 26 SEA FILE=HCAPLUS ABB=ON PLU=ON L38 AND L33  
 L42 1467 SEA FILE=HCAPLUS ABB=ON PLU=ON L12  
 L43 1468 SEA FILE=HCAPLUS ABB=ON PLU=ON L41 OR L42  
 L44 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L43  
 L45 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L43 AND L33  
 L46 42478 SEA FILE=HCAPLUS ABB=ON PLU=ON L24 (L) PREP?  
 L47 41 SEA FILE=HCAPLUS ABB=ON PLU=ON L46 AND (L36 OR L28)  
 L48 26 SEA FILE=HCAPLUS ABB=ON PLU=ON L47 AND L31  
 L49 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L48 AND L43  
 L50 10047 SEA FILE=HCAPLUS ABB=ON PLU=ON HETEROPOLYACID? OR  
 HETERO(A) POLYACID? OR HETERO (2A) POLY(2A)ACID? OR  
 HETEROPOLY (A) ACID?  
 L51 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28  
 L52 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L50  
 L53 254 SEA FILE=HCAPLUS ABB=ON PLU=ON L9  
 L54 162 SEA FILE=HCAPLUS ABB=ON PLU=ON L14  
 L55 355 SEA FILE=HCAPLUS ABB=ON PLU=ON L53 OR L54  
 L56 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L55  
 L57 2789 SEA FILE=HCAPLUS ABB=ON PLU=ON L6  
 L58 1587 SEA FILE=HCAPLUS ABB=ON PLU=ON L11  
 L59 3582 SEA FILE=HCAPLUS ABB=ON PLU=ON L57 OR L58  
 L60 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L59  
 L61 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1344-28-1/RN  
 L62 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1343-93-7/RN  
 L63 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12027-38-2/RN  
 L64 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12027-43-9/RN  
 L65 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12411-74-4/RN  
 L66 1 SEA FILE=REGISTRY ABB=ON PLU=ON POTASSIUM/CN  
 L67 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUBIDIUM/CN  
 L68 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUBIDIN/CN  
 L69 1 SEA FILE=REGISTRY ABB=ON PLU=ON CESIUM/CN  
 L70 1 SEA FILE=REGISTRY ABB=ON PLU=ON AMMONIUM/CN  
 L71 QUE ABB=ON PLU=ON L66 OR POTASSIUM  
 L72 QUE ABB=ON PLU=ON L67 OR RUBIDIUM OR L68  
 L73 QUE ABB=ON PLU=ON L69 OR CESIUM  
 L74 QUE ABB=ON PLU=ON L70 OR AMMONIUM  
 L75 126 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73

OR L74) OR K OR RB OR CS OR NH4) (L) L59

L76 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L28

L77 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L27 AND L76

L78 215241 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73 OR L74) OR K OR RB OR CS OR NH4) (2A) (SALT? OR CATION OR ION OR X OR HALOGEN)

L79 235 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L59

L80 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L79 AND ((L23 OR L24 OR L25))

L81 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 AND L26 AND L27

L82 92912 SEA FILE=HCAPLUS ABB=ON PLU=ON L15

L83 90 SEA FILE=HCAPLUS ABB=ON PLU=ON L19

L84 205 SEA FILE=HCAPLUS ABB=ON PLU=ON L18

L85 377 SEA FILE=HCAPLUS ABB=ON PLU=ON L20

L87 2 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L82 OR L83 OR L84 OR L85)) AND L28

L88 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L59 AND L26

L89 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L88 AND L27

L90 118887 SEA FILE=HCAPLUS ABB=ON PLU=ON ZEOLIT?

L91 48578 SEA FILE=HCAPLUS ABB=ON PLU=ON CATION? (2A) (RESIN? OR POLYM? OR HOMOPOLY? OR COPOLYM? OR (CO OR TER) (W) POLYM? OR TERPOLYM?)

L92 152 SEA FILE=HCAPLUS ABB=ON PLU=ON (L75 OR L59 OR L79) AND ((L82 OR L83 OR L84 OR L85))

L93 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L90 AND L91

L94 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L26 AND (L24 OR L25)

L95 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L30 OR L32 OR (L34 OR L35) OR L37 OR L39 OR (L44 OR L45) OR L49 OR (L51 OR L52) OR L56 OR L60 OR (L76 OR L77) OR (L80 OR L81) OR L87 OR L89 OR L93 OR L94

L96 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L95 OR L40

L97 QUE ABB=ON PLU=ON L17 OR SILICA OR SIO2 OR ( SILICON OR SI) (A) (DIOXIDE OR OXIDE OR O2)

L98 QUE ABB=ON PLU=ON L61 OR ALUMINA OR AL2O3 OR (ALUMINUM OR ALUMINIUM OR AL) (A) (OXIDE OR O3)

L99 18 SEA FILE=REGISTRY ABB=ON PLU=ON O2TI/MF

L100 1 SEA FILE=REGISTRY ABB=ON PLU=ON ACTIVATED CARBON/CN

L101 QUE ABB=ON PLU=ON L99 OR (TITANIUM OR TI) (A) (DIOXIDE OR OXIDE OR O2) OR TIO2

L102 QUE ABB=ON PLU=ON L82 OR ZIRCONIA OR (ZIRCONIUM OR ZR) (A) (DIOXIDE OR O2 OR OXIDE) OR ZRO2

L103 QUE ABB=ON PLU=ON (L100 OR CARBON OR C OR CHARCOAL) (A) ACTIVAT?

L104 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND ((L97 OR L98) OR (L101 OR L102 OR L103))

L105 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 OR L104

L106 28 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND (L33 OR L46)

L107 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L106

L108 QUE ABB=ON PLU=ON L5 OR (HYDROGEN OR H2) (A) (ELEMENT? OR GAS? OR FEED? OR REACT?)

L109 358 SEA FILE=HCAPLUS ABB=ON PLU=ON L108 AND L26 AND (L24 OR L25)

L110 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND L109

L111 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND CLEAV?

L112 QUE ABB=ON PLU=ON (L105 OR L106 OR L107) OR L110 OR L111

L113 7 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 23/SC, SX

L114 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 45/SC, SX

L115 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 67/SC, SX

L116 18 SEA FILE=HCAPLUS ABB=ON PLU=ON (L113 OR L114 OR L115)

L117 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L108

L118 28 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L112 OR L113 OR L114 OR L115 OR L116 OR L117)) AND L46

L119 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L118 AND L108 AND L26  
AND L27  
L120 27252 SEA FILE=HCAPLUS ABB=ON PLU=ON L24(3A) (PRODUC? OR  
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FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR  
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L122 26589 SEA FILE=HCAPLUS ABB=ON PLU=ON ?MERCAP?(2A) (PRODUC?  
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MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)  
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L124 32494 SEA FILE=HCAPLUS ABB=ON PLU=ON ?THIOL?(2A) (PRODUC?  
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MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)  
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L128 QUE ABB=ON PLU=ON 59/SC,SX  
L129 17 SEA FILE=HCAPLUS ABB=ON PLU=ON L126 NOT (L127 OR  
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L131 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L130 AND (L96 OR  
(L104 OR L105 OR L106 OR L107) OR (L110 OR L111 OR  
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OR L119) OR L121 OR L123 OR L125 OR L126 OR L129)  
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L135 2413 SEA FILE=HCAPLUS ABB=ON PLU=ON L62  
L136 1375 SEA FILE=HCAPLUS ABB=ON PLU=ON L63  
L137 97 SEA FILE=HCAPLUS ABB=ON PLU=ON L64  
L138 115 SEA FILE=HCAPLUS ABB=ON PLU=ON L65  
L139 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND ((L135 OR  
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L141 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L105  
L142 3 SEA FILE=HCAPLUS ABB=ON PLU=ON (L139 OR L140 OR  
L141)  
L143 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L142 AND L134

=> d l143 1-3 ibib abs hitstr hitind

L143 ANSWER 1 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:249306 HCAPLUS

DOCUMENT NUMBER: 140:289188

TITLE: **Catalytic process for  
fabrication of alkyl  
mercaptans by the addition reaction of  
hydrogen sulfide with  
alkenes**

INVENTOR(S): Fremy, Georges; Essayem, Nadine; Lacroix,  
Michel; Zausa, Elodie

PATENT ASSIGNEE(S): Atofina, Fr.

SOURCE: Fr. Demande, 14 pp.

CODEN: FRXXBL

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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FR 2844794          A1      20040326      FR 2002-11923
                                           2002
                                           0925

FR 2844794          B1      20041203
CA 2499629          AA      20040408      CA 2003-2499629
                                           2003
                                           0923

WO 2004029005       A1      20040408      WO 2003-FR2789
                                           2003
                                           0923

W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
    CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
    GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
    KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
    MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,
    SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
    UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
    AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
    DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL,
    PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
    GQ, GW, ML, MR, NE, SN, TD, TG

AU 2003282186       A1      20040419      AU 2003-282186
                                           2003
                                           0923

EP 1542944          A1      20050622      EP 2003-773806
                                           2003
                                           0923

R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
    MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
    EE, HU, SK
CN 1701053          A       20051123      CN 2003-825392
                                           2003
                                           0923

JP 2006500416       T2      20060105      JP 2004-539125
                                           2003
                                           0923

US 2006111591       A1      20060525      US 2005-528901
                                           2005
                                           1220

PRIORITY APPLN. INFO.:      FR 2002-11923      A
                                           2002
                                           0925

                                WO 2003-FR2789      W
                                           2003
                                           0923

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OTHER SOURCE(S): MARPAT 140:289188

AB Alkyl **mercaptans** (e.g., Et **mercaptan**) are **prepared** by the addition reaction of an olefin (e.g., ethylene) with **hydrogen sulfide** in the presence of hydrogen and a **catalytic** composition including a **strong acid**, such as a **heteropoly acid** (e.g., 12-phosphotungstic acid) and at least 1 Group VIIIIB metal (e.g., Pd/SiO<sub>2</sub>).

IT 12027-38-2, Silicotungstic acid 39290-95-4, Zirconium tungstate

RL: CAT (Catalyst use); USES (Uses)

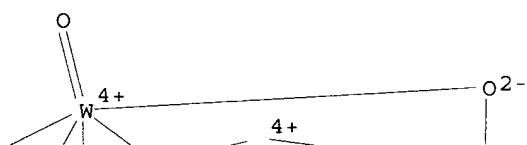
(addition reaction **catalyst** with Group VIIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)

RN 12027-38-2 HCAPLUS

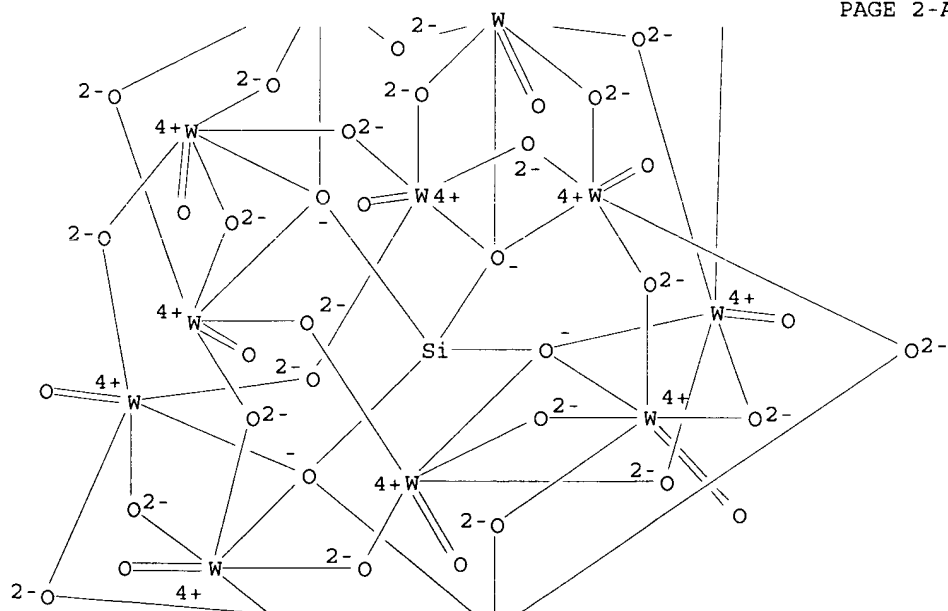
CN Tungstate(4-), [μ<sub>12</sub>-[orthosilicato(4-)-

$\kappa O:\kappa O:\kappa O':\kappa O':\kappa O':\kappa O'$   
 $';\kappa O''';\kappa O''':\kappa O''':\kappa O''':\kappa O''']$ ]tetra  
 cosa-μ-oxododecaoxododeca-, tetrahydrogen (9CI) (CA INDEX  
 NAME)

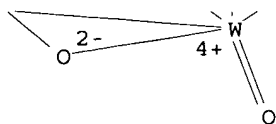
PAGE 1-A



PAGE 2-A



PAGE 3-A

● 4 H<sup>+</sup>

RN 39290-95-4 HCAPLUS  
 CN Tungsten zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
W	x	7440-33-7

IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalyst** with **heteropoly acids** in the **manufacture** of **alkyl mercaptans** by the addition reaction of **hydrogen sulfide** with **alkenes**)

RN 7439-88-5 HCAPLUS  
 CN Iridium (8CI, 9CI) (CA INDEX NAME)

Ir

RN 7439-89-6 HCAPLUS  
 CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-02-0 HCAPLUS  
 CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-04-2 HCAPLUS  
 CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 7440-05-3 HCAPLUS  
 CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS  
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS  
CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-18-8 HCAPLUS  
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

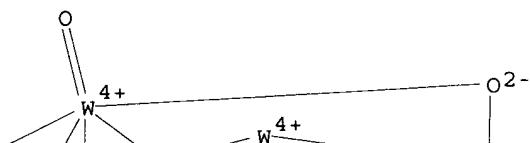
Ru

RN 7440-48-4 HCAPLUS  
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

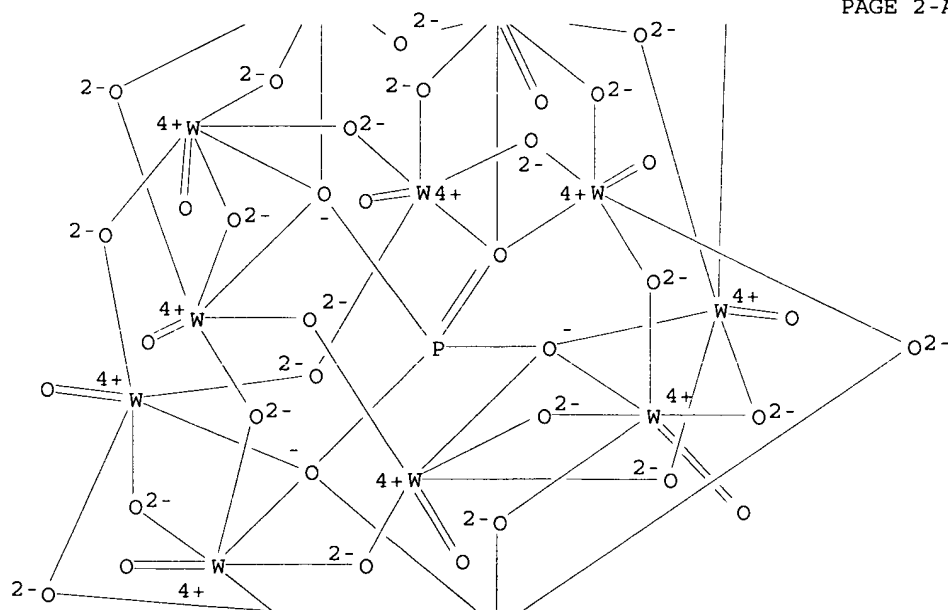
Co

IT 1343-93-7, 12-Phosphotungstic acid  
RL: CAT (Catalyst use); USES (Uses)  
(addition reaction **catalysts** with Group VIIIB metals in  
the **manufacture** of alkyl **mercaptans** by the addition  
reaction of **hydrogen sulfide** with alkenes)  
RN 1343-93-7 HCAPLUS  
CN Tungstate(3-), tetracosam-oxododecaoxo[μ12-[phosphato(3-)-  
κO:κO:κO:κO':κO':κO':κO'  
' :κO'':κO'':κO'':κO'':κO'']]dodec  
a-, trihydrogen (9CI) (CA INDEX NAME)

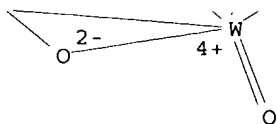
PAGE 1-A



PAGE 2-A



PAGE 3-A

●3 H<sup>+</sup>

IT 7783-06-4, **Hydrogen sulfide**, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (catalytic process for **fabrication** of alkyl  
**mercaptans** by the addition reaction of **hydrogen**  
**sulfide** with alkenes)  
 RN 7783-06-4 HCAPLUS  
 CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

IT 1333-74-0, **Hydrogen**, reactions  
 RL: RGT (Reagent); RACT (Reactant or reagent)  
 (catalytic process for **fabrication** of alkyl  
**mercaptans** by the addition reaction of **hydrogen**  
**sulfide** with alkenes)  
 RN 1333-74-0 HCAPLUS  
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 7631-86-9, **Silica**, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (support; addition reaction **catalyst** with Group VIIIB  
 metals in the **manufacture** of alkyl **mercaptans** by  
 the addition reaction of **hydrogen sulfide** with  
 alkenes)  
 RN 7631-86-9 HCAPLUS  
 CN Silica (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

O=Si=O

IC ICM C07C319-04  
 ICS B01J023-40; B01J023-74; B01J103-52  
 CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and  
 Waxes)  
 Section cross-reference(s): 23, 48, 67  
 ST alkyl **mercaptan** manuf alkene **catalytic**  
 addn reaction **hydrogen sulfide**;  
**ethanethiol** manuf ethylene **catalytic**  
 addn reaction **hydrogen sulfide**;  
 ethyl **mercaptan** manuf ethene **catalytic**  
 addn reaction **hydrogen sulfide**  
 IT Cation exchangers  
 (acidic; addition reaction **catalysts** with Group VIIIB  
 metals in the **manufacture** of alkyl **mercaptans** by  
 the addition reaction of **hydrogen sulfide** with  
 alkenes)

- IT Zeolites (synthetic), uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalyst** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Platinum-group metals  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalyst** with **heteropoly acids** in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT **Heteropoly acids**  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalysts** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Group VIII elements  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalysts** with **heteropoly acids** in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT **Thiols, preparation**  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (catalytic process for **fabrication** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Alkenes, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (catalytic process for **fabrication** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Addition reaction  
 (for **fabrication** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT Addition reaction **catalysts**  
 (**heteropoly acids** and Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 7440-09-7, Potassium, uses 7440-17-7, Rubidium, uses 7440-46-2, Cesium, uses 12027-38-2, Silicotungstic acid 12067-99-1, Phosphotungstic acid 14644-61-2, Zirconium sulfate 14798-03-9, Ammonium, uses 39290-95-4, Zirconium tungstate  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalyst** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalyst** with **heteropoly acids** in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 1343-93-7, 12-Phosphotungstic acid  
 RL: CAT (Catalyst use); USES (Uses)  
 (addition reaction **catalysts** with Group VIIIB metals in the **manufacture** of alkyl **mercaptans** by the addition reaction of **hydrogen sulfide** with alkenes)
- IT 75-08-1P, Ethyl **mercaptan**  
 RL: IMF (Industrial manufacture); PREP (Preparation)

(catalytic process for fabrication of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

IT 74-85-1, Ethylene, reactions 7783-06-4, Hydrogen sulfide, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
(catalytic process for fabrication of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

IT 1333-74-0, Hydrogen, reactions

RL: RGT (Reagent); RACT (Reactant or reagent)  
(catalytic process for fabrication of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

IT 7631-86-9, Silica, uses

RL: CAT (Catalyst use); USES (Uses)  
(support; addition reaction catalyst with Group VIIIIB metals in the manufacture of alkyl mercaptans by the addition reaction of hydrogen sulfide with alkenes)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L143 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:249291 HCAPLUS

DOCUMENT NUMBER: 140:270552

TITLE: Catalytic process for  
manufacturing of mercaptans  
by hydrogen sulfide-  
cleavage of thioether in the  
presence of H2

INVENTOR(S): Fremy, Georges; Essayem, Nadine; Lacroix,  
Michel; Zausa, Elodie

PATENT ASSIGNEE(S): Atofina, Fr.

SOURCE: Fr. Demande, 15 pp.

CODEN: FRXXBL

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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FR 2844726	A1	20040326	FR 2002-11922	2002 0925
FR 2844726	B1	20041203		
CA 2499632	AA	20040408	CA 2003-2499632	2003 0923
WO 2004029022	A2	20040408	WO 2003-FR2790	2003 0923
WO 2004029022	A3	20040506		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,  
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,  
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,  
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,  
SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,  
AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,  
DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL,



PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG

AU 2003282187 A1 20040419 AU 2003-282187 2003  
0923

EP 1542795 A2 20050622 EP 2003-773807 2003  
0923

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,  
MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,  
EE, HU, SK

CN 1694761 A 20051109 CN 2003-825118 2003  
0923

JP 2006500417 T2 20060105 JP 2004-539126 2003  
0923

US 2006025633 A1 20060202 US 2005-528861 2005  
0323

PRIORITY APPLN. INFO.: FR 2002-11922 A 2002  
0925

WO 2003-FR2790 W 2003  
0923

## OTHER SOURCE(S):

MARPAT 140:270552

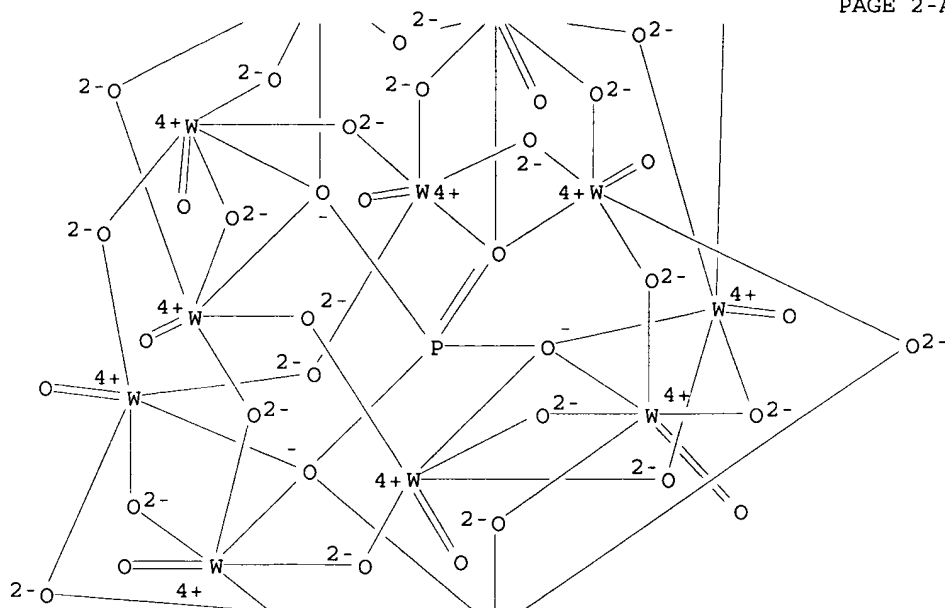
AB The invention is directed to a **catalytic** process for  
**preparation mercaptans** RSR' from **thioether**  
and **hydrogen sulfide**, in the presence of  
hydrogen and of a **catalytic** composition including a  
**strong acid**, in particular a  
**heteropolyacids**, and at least a Group VIII metal [R, R' =  
independently cyclo/alkyl]. The advantages include lower reaction  
temps., high yield and purity of **mercaptans**, and high  
activity of the **catalyst** in time. Thus, mixing an aqueous  
solution of **SiO2** with **PdCl2** and **H3PW12O40** (HPW) gave a  
**catalytic** composition consisting of 59% **SiO2**, 1% **Pd**,  
and 40% **HPW**. Et **mercaptan** was **prepared**, in  
49.3% yield, by **hydrogen sulfide-**  
**cleavage** of di-Et sulfide in the presence of **H2** and the  
above **catalytic** composition at 15 bar and 235°.

IT 1314-23-4, Zirconium dioxide, uses  
1343-93-7D, potassium, rubidium,  
cesium, ammonium salts  
1344-28-1, Alumina, uses 7439-88-5,  
Iridium, uses 7440-02-0, Nickel, uses 7440-04-2  
, Osmium, uses 7440-05-3, Palladium, uses  
7440-06-4, Platinum, uses 7440-16-6, Rhodium,  
uses 7440-48-4, Cobalt, uses 7631-86-9,  
Silica, uses 12027-38-2D, potassium,  
rubidium, cesium, ammonium  
salts 12027-43-9 12411-74-4D,  
potassium, rubidium, cesium,  
ammonium salts 12501-23-4  
13463-67-7, Titanium dioxide, uses  
39290-95-4, Zirconium tungstate 84973-55-7  
RL: CAT (Catalyst use); USES (Uses)  
(**catalytic** composition component; **preparation** of  
**mercaptans** by **hydrogen sulfide-**  
**cleavage** of **thioether** in the presence of **H2**,  
and a **catalyst** composition, in particular  
**heteropolyacids/Pd/SiO2**)

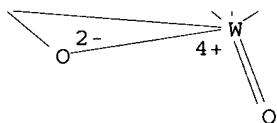
RN 1314-23-4 HCAPLUS



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● 3 H<sup>+</sup>

RN 1344-28-1 HCAPLUS  
 CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7439-88-5 HCAPLUS  
 CN Iridium (8CI, 9CI) (CA INDEX NAME)

Ir

RN 7440-02-0 HCAPLUS  
 CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-04-2 HCAPLUS  
 CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 7440-05-3 HCAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS  
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS  
CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-48-4 HCAPLUS  
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

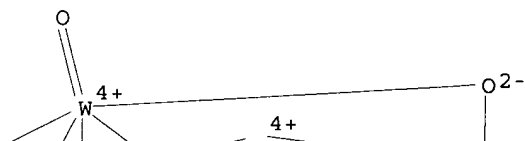
Co

RN 7631-86-9 HCAPLUS  
CN Silica (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

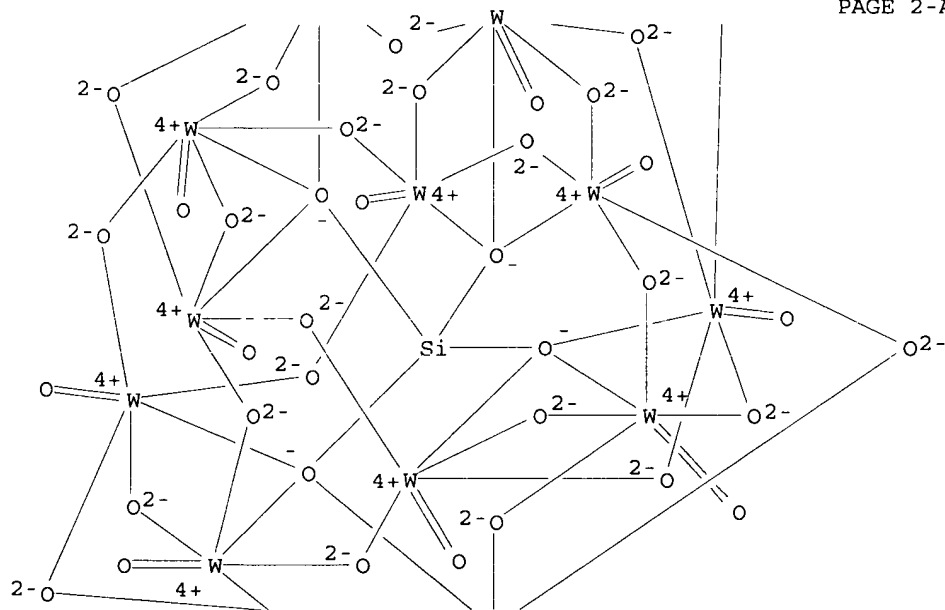
O=Si=O

RN 12027-38-2 HCAPLUS  
CN Tungstate(4-), [μ12-[orthosilicato(4-)-  
κO:κO:κO:κO':κO':κO':κO'  
' :κO':κO':κO':κO':κO']tetra  
cosa-μ-oxododecaoxododeca-, tetrahydrogen (9CI) (CA INDEX  
NAME)

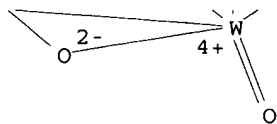
PAGE 1-A



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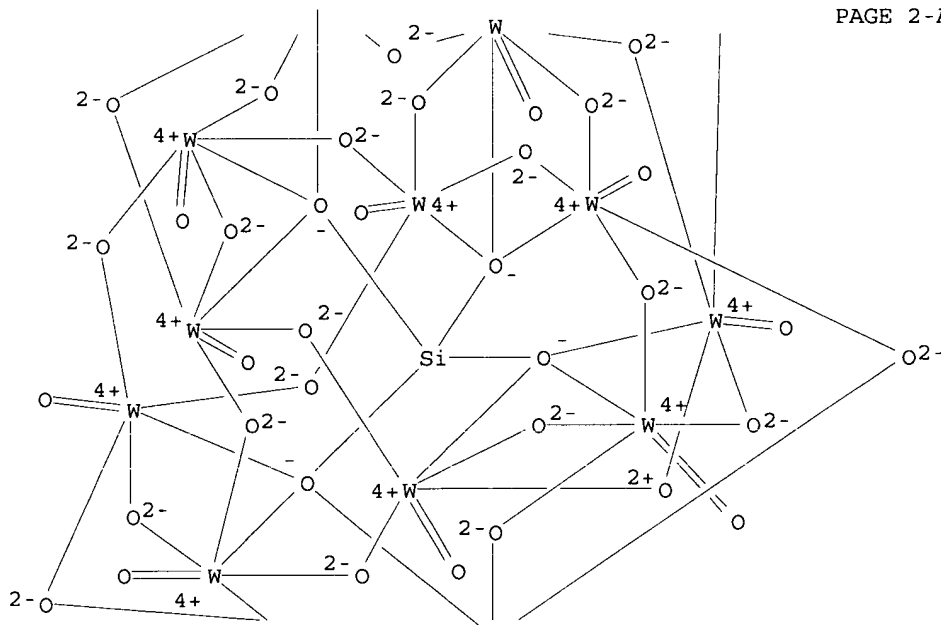


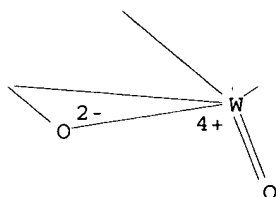
RN 12027-43-9 HCAPLUS  
 CN Tungstate(4-), [μ12-[orthosilicato(4-)-  
 κO:κO:κO:κO':κO':κO':κO'  
 ':κO':κO':κO':κO':κO':κO']tetra  
 cosa-μ-oxododecaoxododeca-, tetrahydrogen, hydrate (9CI) (CA  
 INDEX NAME)

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT

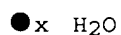
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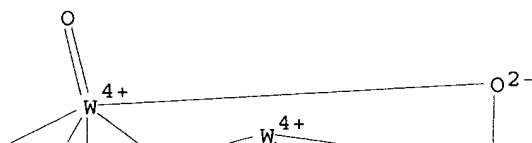


RN 12411-74-4 HCAPLUS  
 CN Tungstate(6-), hexatriaconta-μ-oxooctadeca-oxobis[μ9-  
 [phosphato(3-)-κO:κO:κO:κO':κO':.kap  
 pa.O':κO':κO':κO']octadeca-, hexahydrogen  
 (9CI) (CA INDEX NAME)

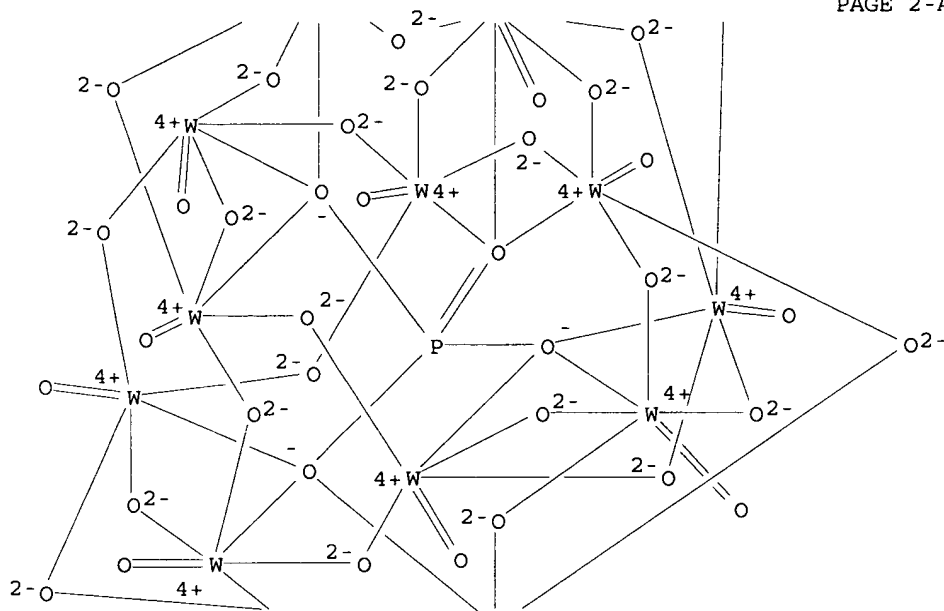
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 12501-23-4 HCAPLUS  
 CN Tungstate(3-), tetracos-μ-oxododeca-oxo[μ12-[phosphato(3-)-  
 O:O:O:O':O':O':O':O':O':O':O':O':O']dodeca-, trihydrogen,  
 hydrate (9CI) (CA INDEX NAME)

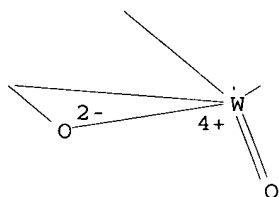
PAGE 1-A



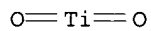
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● 3 H<sup>+</sup>● x H<sub>2</sub>O

RN 13463-67-7 HCAPLUS  
 CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 39290-95-4 HCAPLUS  
 CN Tungsten zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====		
O	x	17778-80-2
Zr	x	7440-67-7
W	x	7440-33-7



RN 84973-55-7 HCAPLUS  
 CN Tungstate(6-), hexatriaconta- $\mu$ -oxooctadeca- $\mu$ 9-  
 [phosphato(3-)- $\kappa$ O: $\kappa$ O: $\kappa$ O: $\kappa$ O': $\kappa$ O':..kap  
 pa.O': $\kappa$ O': $\kappa$ O': $\kappa$ O': $\kappa$ O':..]]octadeca-,  
 hexahydrogen, hydrate (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT 7440-18-8, Ruthenium, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (preparation of mercaptans by hydrogen  
 sulfide-cleavage of thioether in  
 the presence of H<sub>2</sub>, and a catalyst composition, in  
 particular heteropolyacids/Pd/SiO<sub>2</sub>)  
 RN 7440-18-8 HCAPLUS  
 CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

IT 7783-06-4, Hydrogen sulfide, reactions  
 RL: RCT (Reactant); RGT (Reagent); RACT (Reactant or reagent)  
 (preparation of mercaptans by hydrogen  
 sulfide-cleavage of thioether in  
 the presence of H<sub>2</sub>, and a catalyst composition, in  
 particular heteropolyacids/Pd/SiO<sub>2</sub>)  
 RN 7783-06-4 HCAPLUS  
 CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

IT 1333-74-0, Hydrogen, reactions  
 RL: RGT (Reagent); RACT (Reactant or reagent)  
 (preparation of mercaptans by hydrogen  
 sulfide-cleavage of thioether in  
 the presence of H<sub>2</sub>, and a catalyst composition, in  
 particular heteropolyacids/Pd/SiO<sub>2</sub>)  
 RN 1333-74-0 HCAPLUS  
 CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IC ICM B01J027-182  
 ICS B01J027-186; B01J023-30; B01J021-18; C07C319-04  
 CC 23-7 (Aliphatic Compounds)  
 Section cross-reference(s): 45, 67  
 ST mercaptan prepn thioether  
 hydrogen sulfide cleavage  
 heteropolyacid; silica supported  
 heteropolyacid palladium mercaptan prepn  
 thioether cleavage hydrogen  
 IT Group VIII elements  
 Heteropoly acids  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalyst composition; preparation of  
 mercaptans by hydrogen sulfide-  
 cleavage of thioether in the presence of H<sub>2</sub>,  
 and a catalyst composition, in particular  
 heteropolyacids/Pd/SiO<sub>2</sub>)  
 IT Catalysts  
 (catalytic composition component; preparation of

- mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT Zeolites (synthetic), uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalytic composition component; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT Resins  
 RL: CAT (Catalyst use); USES (Uses)  
 (cationic; catalyst composition component; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT Bond cleavage  
 Bond cleavage catalysts  
 Catalysis  
 Solid phase synthesis  
 (preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT Thiols, preparation  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (products; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT Thioethers  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (starting materials; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT 7647-10-1, Palladium chloride  
 RL: RGT (Reagent); RACT (Reactant or reagent)  
 (catalyst precursor; preparation of mercaptans by hydrogen sulfide-cleavage of thioether in the presence of H<sub>2</sub>, and a catalyst composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>)
- IT 1314-23-4, Zirconium dioxide, uses  
 1343-93-7D, potassium, rubidium, cesium, ammonium salts  
 1344-28-1, Alumina, uses 7439-88-5, Iridium, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-44-0, Carbon, uses 7440-48-4, Cobalt, uses 7631-86-9, Silica, uses 12027-38-2D, potassium, rubidium, cesium, ammonium salts 12027-43-9  
 12411-74-4D, potassium, rubidium, cesium, ammonium salts  
 12501-23-4 13463-67-7, Titanium dioxide, uses 14644-61-2 39290-95-4, Zirconium tungstate 84973-55-7  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalytic composition component; preparation of mercaptans by hydrogen sulfide-

cleavage of thioether in the presence of H<sub>2</sub>,  
and a catalyst composition, in particular  
heteropolyacids/Pd/SiO<sub>2</sub>)

IT 75-08-1P, Ethyl mercaptan  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(mercaptan product; preparation of  
mercaptans by hydrogen sulfide-  
cleavage of thioether in the presence of H<sub>2</sub>,  
and a catalyst composition, in particular  
heteropolyacids/Pd/SiO<sub>2</sub>)

IT 7440-18-8, Ruthenium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(preparation of mercaptans by hydrogen  
sulfide-cleavage of thioether in  
the presence of H<sub>2</sub>, and a catalyst composition, in  
particular heteropolyacids/Pd/SiO<sub>2</sub>)

IT 7783-06-4, Hydrogen sulfide, reactions  
RL: RCT (Reactant); RGT (Reagent); RACT (Reactant or reagent)  
(preparation of mercaptans by hydrogen  
sulfide-cleavage of thioether in  
the presence of H<sub>2</sub>, and a catalyst composition, in  
particular heteropolyacids/Pd/SiO<sub>2</sub>)

IT 1333-74-0, Hydrogen, reactions  
RL: RGT (Reagent); RACT (Reactant or reagent)  
(preparation of mercaptans by hydrogen  
sulfide-cleavage of thioether in  
the presence of H<sub>2</sub>, and a catalyst composition, in  
particular heteropolyacids/Pd/SiO<sub>2</sub>)

IT 352-93-2, Diethylsulfide  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(starting material; preparation of mercaptans by  
hydrogen sulfide-cleavage of  
thioether in the presence of H<sub>2</sub>, and a catalyst  
composition, in particular heteropolyacids/Pd/SiO<sub>2</sub>  
)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L143 ANSWER 3 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:181632 HCAPLUS

DOCUMENT NUMBER: 124:203320

TITLE: Preparation of bisphenol A in presence of a  
polysiloxane catalyst and preparation of the  
catalyst

INVENTOR(S): Inoue, Kaoru; Ohkubo, Tuneyuki; Terajima,  
Takashi

PATENT ASSIGNEE(S): Mitsui Toatsu Chemicals, Inc., Japan

SOURCE: Eur. Pat. Appl., 23 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 693470	A1	19960124	EP 1995-111437	1995 0720
EP 693470	B1	19980520		
R: DE, GB, NL				
JP 08208545	A2	19960813	JP 1995-141828	1995 0608

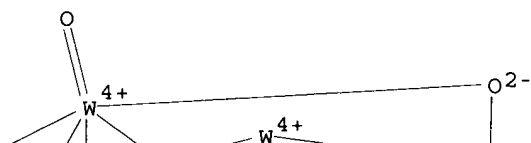
AB Bisphenol A is prepared with a high conversion and selectivity by reacting PhOH with acetone in the presence of a polyorganosiloxane having a mercapto group-containing hydrocarbon group, and an acid, preferably as a sulfonic acid group on the polyorganosiloxane. The preferred polyorganosiloxane is prepared by hydrolyzing  $\geq 1$  silane  $XnSiR_4-n$  ( $R = C_1-20$  hydrocarbyl having  $\geq 1$  SH,  $C_1-15$  alkyl having  $\geq 1$  halogen,  $C_2-15$  olefinic hydrocarbyl,  $C_2-15$  epoxy-containing hydrocarbyl;  $X = Cl, Br, I, \text{alkoxy}$ ;  $n = 1-3$ ), sulfonating the R group, silylating with  $\geq 1$  silane  $XnSi(R_1)_4-n$  ( $R_1 = C_1-20$  hydrocarbon having  $\geq 1$  SH;  $X$  and  $n$  as above), and hydrolyzing. Thus, 1.90 g acetone and 33.00 g PhOH were reacted in the presence of 2.00 g dodecatungstophosphoric acid (2/3 of protons exchanged with ammonium cations) and 0.06 g catalyst prepared from 10.0 g each of  $Si(OEt)_4$  and  $(HSCH_2CH_2CH_2)Si(OMe)_3$ , to give bisphenol A in 87.6% yield.

IT 1343-93-7 12027-38-2  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst; preparation of bisphenol A in presence of a polysiloxane catalyst and preparation of the catalyst)

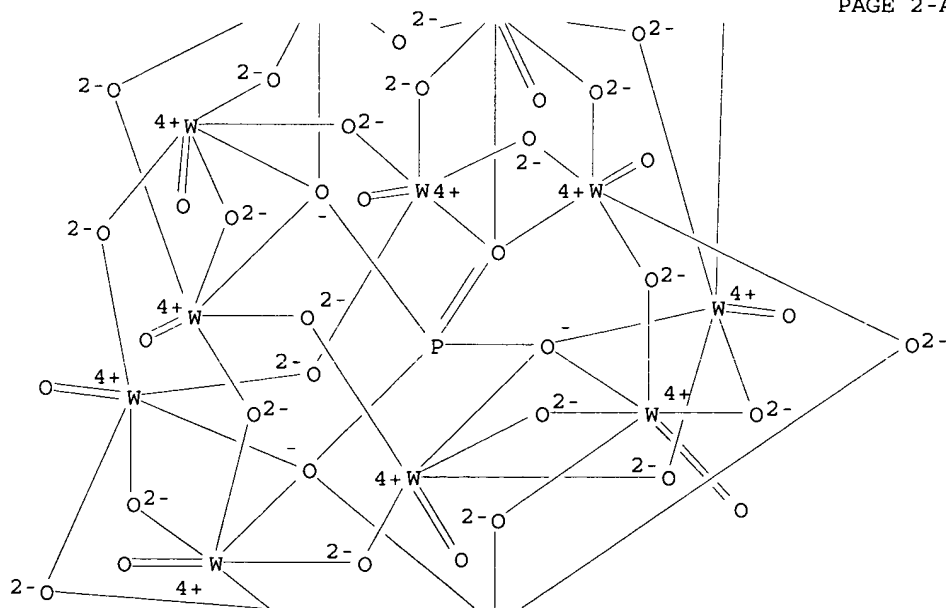
RN 1343-93-7 HCAPLUS

CN Tungstate(3-), tetracosam- $\mu$ -oxododecaoxo [ $\mu_{12}$ -[phosphato(3-)-  
:K:O:K:O:K:O':K:O':K:O'  
':K:O':K:O':K:O':K:O':K:O':K:O':K:O':K:O':K:O':K:O']dodeca-  
a-, trihydrogen (9CI) (CA INDEX NAME)

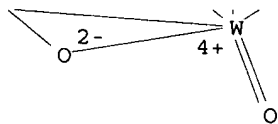
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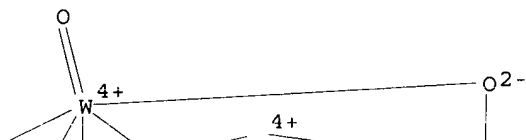


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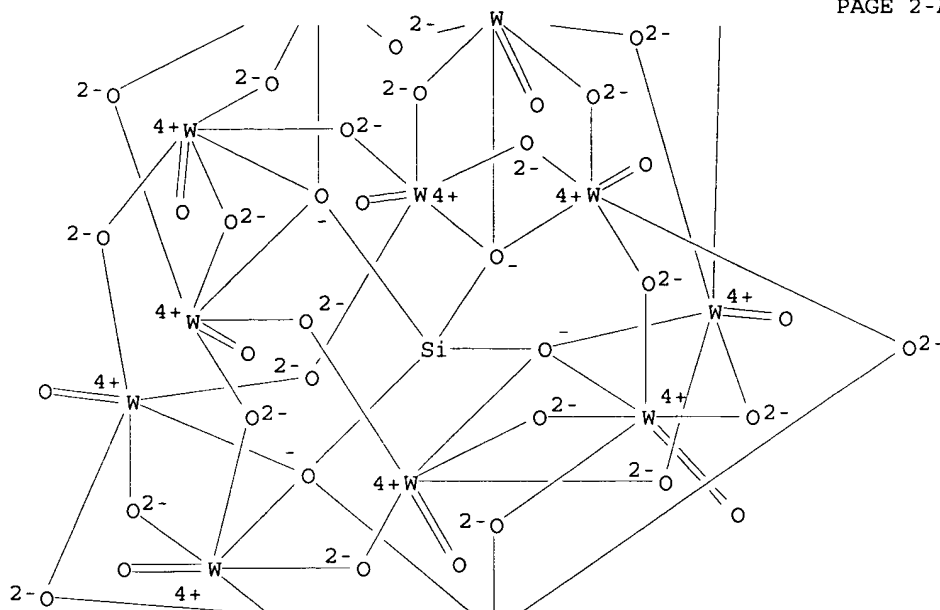
● 3 H<sup>+</sup>

RN 12027-38-2 HCAPLUS  
 CN Tungstate(4-), [μ12-[orthosilicato(4-)-  
 κO:κO:κO:κO':κO':κO':κO'  
 ':κO':κO':κO':κO':κO':κO']tetra  
 cosa-μ-oxododecaoxododeca-, tetrahydrogen (9CI) (CA INDEX  
 NAME)

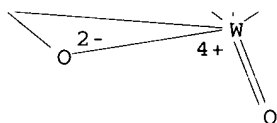
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● 4 H<sup>+</sup>

- IC ICM C07C037-20  
ICS C08G077-392
- CC 35-3 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 25
- ST bisphenol A **prepn** polyorganosiloxane catalyst; phenol  
acetone reaction polyorganosiloxane catalyst; acid  
**mercaptosiloxane** cocatalyst condensation; ammonium  
dodecatungstophosphate catalyst; tetraethoxysilane  
**mercaptopropyltrimethoxysilane** catalyst
- IT Siloxanes and Silicones, uses  
RL: CAT (Catalyst use); USES (Uses)  
(**mercapto**, **preparation** of bisphenol A in  
presence of a polysiloxane catalyst and **preparation** of the  
catalyst)
- IT 1343-93-7 7647-01-0, Hydrochloric acid, uses  
9003-70-7D, Divinylbenzene-styrene copolymer, sulfonated  
9037-24-5, Amberlyst 15 12026-88-9 12026-92-5  
12027-38-2  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst; preparation of bisphenol A in presence of a polysiloxane  
catalyst and preparation of the catalyst)
- IT 78-08-0, Vinyltriethoxysilane 78-10-4, Tetraethoxysilane  
780-69-8, Phenyltriethoxysilane 998-30-1, Triethoxysilane  
1561-92-8, Sodium methallyl sulfonate 2495-39-8, Sodium allyl

sulfonate 2530-83-8, 3-Glycidoxypentyltrimethoxysilane  
 3039-83-6, Sodium vinyl sulfonate 4420-74-0, 3-  
**Mercaptopropyltrimethoxysilane** 7631-90-5, Sodium  
 bisulfite 7664-93-9, Sulfuric acid, uses 7697-37-2, Nitric  
 acid, uses 7757-83-7, Sodium sulfite 18143-56-1 25512-39-4,  
 Chloropropyltrimethoxysilane 27457-28-9, Sodium styrene  
 sulfonate 31001-77-1, 3-**Mercaptopropyl**dimethoxymethylsilane

RL: CAT (Catalyst use); USES (Uses)  
 (catalysts from; **preparation** of bisphenol A in presence of  
 a polysiloxane catalyst and **preparation** of the catalyst)

=> => d que stat l144

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 1314-23-4/BI OR 1333-74-0/BI OR 1343-93-7/BI OR  
 1344-28-1/BI OR 13463-67-7/BI OR 14644-61-2/BI OR  
 352-93-2/BI OR 39290-95-4/BI OR 7439-88-5/BI OR  
 7440-02-0/BI OR 7440-04-2/BI OR 7440-05-3/BI OR  
 7440-06-4/BI OR 7440-16-6/BI OR 7440-18-8/BI OR  
 7440-44-0/BI OR 7440-48-4/BI OR 75-08-1/BI OR 7631-86-9  
 /BI OR 7647-10-1/BI OR 7783-06-4/BI OR 84973-55-7/BI)  
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 L4 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7783-06-4/RN  
 L5 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1333-74-0/RN  
 L6 129 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)P(L)W)/ELS(L  
 )4/ELC.SUB  
 L7 58 SEA FILE=REGISTRY ABB=ON PLU=ON L6 AND H2O  
 L9 45 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND O40PW12  
 L11 72 SEA FILE=REGISTRY ABB=ON PLU=ON (H(L)O(L)SI(L)W)/ELS(  
 L)4/ELC.SUB  
 L12 2 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND L2  
 L13 51 SEA FILE=REGISTRY ABB=ON PLU=ON L11 AND O40SIW12  
 L14 36 SEA FILE=REGISTRY ABB=ON PLU=ON L13 AND H2O  
 L15 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1314-23-4/RN  
 L17 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7631-86-9/RN  
 L18 42 SEA FILE=REGISTRY ABB=ON PLU=ON (S(L)O(L)ZR)/ELS(L)3/  
 ELC.SUB  
 L19 14 SEA FILE=REGISTRY ABB=ON PLU=ON L18 AND O4S  
 L20 53 SEA FILE=REGISTRY ABB=ON PLU=ON (W(L)O(L)ZR)/ELS(L)3/  
 ELC.SUB  
 L23 26082 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPTAN  
 L24 146017 SEA FILE=HCAPLUS ABB=ON PLU=ON MERCAPT?  
 L25 14375 SEA FILE=HCAPLUS ABB=ON PLU=ON THIOETHER OR THIO(A)ET  
 HER  
 L26 114741 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR (HYDROGEN OR H2  
 OR H) (A) (SULPHIDE OR SULFIDE OR S) OR H2S  
 L27 1006379 SEA FILE=HCAPLUS ABB=ON PLU=ON L3  
 L28 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L25 AND L26 AND L27  
 L29 QUE ABB=ON PLU=ON STRONG? (A)ACID?  
 L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L28  
 L31 1588885 SEA FILE=HCAPLUS ABB=ON PLU=ON CATALY? OR ACTIVATOR?  
 OR ACCELERANT? OR ENHANCER? OR ACCELERAT!R?  
 L32 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L31  
 L33 8446 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 (L) PREP?  
 L34 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L33 AND L28  
 L35 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND ACID?  
 L36 299 SEA FILE=HCAPLUS ABB=ON PLU=ON (L23 OR L25) AND L26  
 AND L27  
 L37 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L29  
 L38 169 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L31  
 L39 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L38 AND L35  
 L40 26 SEA FILE=HCAPLUS ABB=ON PLU=ON L38 AND L33  
 L42 1467 SEA FILE=HCAPLUS ABB=ON PLU=ON L12  
 L43 1468 SEA FILE=HCAPLUS ABB=ON PLU=ON LL41 OR L42



L44 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L43  
 L45 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L43 AND L33  
 L46 42478 SEA FILE=HCAPLUS ABB=ON PLU=ON L24 (L) PREP?  
 L47 41 SEA FILE=HCAPLUS ABB=ON PLU=ON L46 AND (L36 OR L28)  
 L48 26 SEA FILE=HCAPLUS ABB=ON PLU=ON L47 AND L31  
 L49 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L48 AND L43  
 L50 10047 SEA FILE=HCAPLUS ABB=ON PLU=ON HETEROPOLYACID? OR  
 HETERO (A) POLYACID? OR HETERO (2A) POLY (2A) ACID? OR  
 HETEROPOLY (A) ACID?  
 L51 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28  
 L52 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L36 AND L50  
 L53 254 SEA FILE=HCAPLUS ABB=ON PLU=ON L9  
 L54 162 SEA FILE=HCAPLUS ABB=ON PLU=ON L14  
 L55 355 SEA FILE=HCAPLUS ABB=ON PLU=ON L53 OR L54  
 L56 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L55  
 L57 2789 SEA FILE=HCAPLUS ABB=ON PLU=ON L6  
 L58 1587 SEA FILE=HCAPLUS ABB=ON PLU=ON L11  
 L59 3582 SEA FILE=HCAPLUS ABB=ON PLU=ON L57 OR L58  
 L60 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L59  
 L61 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1344-28-1/RN  
 L62 1 SEA FILE=REGISTRY ABB=ON PLU=ON 1343-93-7/RN  
 L63 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12027-38-2/RN  
 L64 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12027-43-9/RN  
 L65 1 SEA FILE=REGISTRY ABB=ON PLU=ON 12411-74-4/RN  
 L66 1 SEA FILE=REGISTRY ABB=ON PLU=ON POTASSIUM/CN  
 L67 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUBIDIUM/CN  
 L68 1 SEA FILE=REGISTRY ABB=ON PLU=ON RUBIDIN/CN  
 L69 1 SEA FILE=REGISTRY ABB=ON PLU=ON CESIUM/CN  
 L70 1 SEA FILE=REGISTRY ABB=ON PLU=ON AMMONIUM/CN  
 L71 QUE ABB=ON PLU=ON L66 OR POTASSIUM  
 L72 QUE ABB=ON PLU=ON L67 OR RUBIDIUM OR L68  
 L73 QUE ABB=ON PLU=ON L69 OR CESIUM  
 L74 QUE ABB=ON PLU=ON L70 OR AMMONIUM  
 L75 126 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73  
 OR L74) OR K OR RB OR CS OR NH4) (L) L59  
 L76 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L28  
 L77 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L27 AND L76  
 L78 215241 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L71 OR L72 OR L73  
 OR L74) OR K OR RB OR CS OR NH4) (2A) (SALT? OR CATION  
 OR ION OR X OR HALOGEN)  
 L79 235 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L59  
 L80 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L79 AND ((L23 OR L24  
 OR L25))  
 L81 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 AND L26 AND L27  
 L82 92912 SEA FILE=HCAPLUS ABB=ON PLU=ON L15  
 L83 90 SEA FILE=HCAPLUS ABB=ON PLU=ON L19  
 L84 205 SEA FILE=HCAPLUS ABB=ON PLU=ON L18  
 L85 377 SEA FILE=HCAPLUS ABB=ON PLU=ON L20  
 L87 2 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L82 OR L83 OR L84  
 OR L85)) AND L28  
 L88 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L59 AND L26  
 L89 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L88 AND L27  
 L90 118887 SEA FILE=HCAPLUS ABB=ON PLU=ON ZEOLIT?  
 L91 48578 SEA FILE=HCAPLUS ABB=ON PLU=ON CATION? (2A) (RESIN? OR  
 POLYM? OR HOMOPOLY? OR COPOLYM? OR (CO OR TER) (W) POLYM?  
 OR TERPOLYM?)  
 L92 152 SEA FILE=HCAPLUS ABB=ON PLU=ON (L75 OR L59 OR L79)  
 AND ((L82 OR L83 OR L84 OR L85))  
 L93 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L90 AND L91  
 L94 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L92 AND L26 AND (L24  
 OR L25)  
 L95 23 SEA FILE=HCAPLUS ABB=ON PLU=ON L30 OR L32 OR (L34 OR  
 L35) OR L37 OR L39 OR (L44 OR L45) OR L49 OR (L51 OR  
 L52) OR L56 OR L60 OR (L76 OR L77) OR (L80 OR L81) OR  
 L87 OR L89 OR L93 OR L94  
 L96 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L95 OR L40

L97 QUE ABB=ON PLU=ON L17 OR SILICA OR SIO2 OR( SILICON  
 OR SI) (A) (DIOXIDE OR OXIDE OR O2)  
 L98 QUE ABB=ON PLU=ON L61 OR ALUMINA OR AL2O3 OR (ALUMIN  
 UM OR ALUMINIUM OR AL) (A) (OXIDE OR O3)  
 L99 18 SEA FILE=REGISTRY ABB=ON PLU=ON O2TI/MF  
 L100 1 SEA FILE=REGISTRY ABB=ON PLU=ON ACTIVATED CARBON/CN  
 L101 QUE ABB=ON PLU=ON L99 OR (TITANIUM OR TI) (A) (DIOXIDE  
 OR OXIDE OR O2) OR TIO2  
 L102 QUE ABB=ON PLU=ON L82 OR ZIRCONIA OR (ZIRCONIUM OR Z  
 R) (A) (DIOXIDE OR O2 OR OXIDE) OR ZRO2  
 L103 QUE ABB=ON PLU=ON (L100 OR CARBON OR C OR CHARCOAL) (A) ACTIVAT?  
 L104 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND ((L97 OR L98)  
 OR (L101 OR L102 OR L103))  
 L105 46 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 OR L104  
 L106 28 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND (L33 OR L46)  
  
 L107 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L106  
 L108 QUE ABB=ON PLU=ON L5 OR (HYDROGEN OR H2) (A) (ELEMENT?  
 OR GAS? OR FEED? OR REACT?)  
 L109 358 SEA FILE=HCAPLUS ABB=ON PLU=ON L108 AND L26 AND (L24  
 OR L25)  
 L110 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND L109  
 L111 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L105 AND CLEAV?  
 L112 QUE ABB=ON PLU=ON (L105 OR L106 OR L107) OR L110 OR  
 L111  
 L113 7 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 23/SC,SX  
 L114 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 45/SC,SX  
 L115 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L112 AND 67/SC,SX  
 L116 18 SEA FILE=HCAPLUS ABB=ON PLU=ON (L113 OR L114 OR  
 L115)  
 L117 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L108  
 L118 28 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L112 OR L113 OR  
 L114 OR L115 OR L116 OR L117)) AND L46  
 L119 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L118 AND L108 AND L26  
 AND L27  
 L120 27252 SEA FILE=HCAPLUS ABB=ON PLU=ON L24 (3A) (PRODUC? OR  
 PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR  
 FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR  
 MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)  
 L121 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L120 AND L118  
 L122 26589 SEA FILE=HCAPLUS ABB=ON PLU=ON ?MERCAP? (2A) (PRODUC?  
 OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR  
 FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR  
 MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)  
 L123 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L122 AND (L121 OR  
 L105)  
 L124 32494 SEA FILE=HCAPLUS ABB=ON PLU=ON ?THIOL? (2A) (PRODUC?  
 OR PROD# OR GENERAT? OR MANUF? OR MFR# OR CREAT? OR  
 FORM## OR FORMING# OR FORMAT? OR MAKE# OR MADE# OR  
 MAKIN# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR PREP#)  
 L125 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L124 AND L105  
 L126 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L117 OR L119 OR L121  
 OR L123 OR L125  
 L127 QUE ABB=ON PLU=ON 6/SC,SX  
 L128 QUE ABB=ON PLU=ON 59/SC,SX  
 L129 17 SEA FILE=HCAPLUS ABB=ON PLU=ON L126 NOT (L127 OR  
 L128)  
 L130 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L129 NOT FUEL?/SC,SX  
 L131 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L130 AND (L96 OR  
 (L104 OR L105 OR L106 OR L107) OR (L110 OR L111 OR  
 L112 OR L113 OR L114 OR L115 OR L116 OR L117 OR L118  
 OR L119) OR L121 OR L123 OR L125 OR L126 OR L129)  
 L132 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND L59  
 L133 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND L50  
 L134 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 OR L133

L135 2413 SEA FILE=HCAPLUS ABB=ON PLU=ON L62  
 L136 1375 SEA FILE=HCAPLUS ABB=ON PLU=ON L63  
 L137 97 SEA FILE=HCAPLUS ABB=ON PLU=ON L64  
 L138 115 SEA FILE=HCAPLUS ABB=ON PLU=ON L65  
 L139 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 AND ((L135 OR  
 L136 OR L137 OR L138))  
 L140 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L131  
 L141 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L55 AND L105  
 L142 3 SEA FILE=HCAPLUS ABB=ON PLU=ON (L139 OR L140 OR  
 L141)  
 L143 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L142 AND L134  
 L144 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L131 NOT L143

=> d l144 1-12 ibib abs hitstr hitind

L144 ANSWER 1 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:402973 HCAPLUS

DOCUMENT NUMBER: 145:64832

TITLE: Iron Modified MCM-41 Materials Characterized  
by Methanol Oxidation and Sulphurization  
Reactions

AUTHOR(S): Trejda, M.; Kujawa, J.; Ziolek, M.

CORPORATE SOURCE: Faculty of Chemistry, A. Mickiewicz  
University, Poznan, PL-60-780, Pol.

SOURCE: Catalysis Letters (2006), 108(3-4), 141-146  
CODEN: CALEER; ISSN: 1011-372X

PUBLISHER: Springer

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The zeolites SiMCM-41, AlMCM-41, NbMCM-41 were used as supports  
for iron **catalyst** species introduced by wet impregnation  
and chemical vapor deposition (CVD) methods. Methanol oxidation and  
sulfurization were used for characterization of **catalytic**  
properties. The support nature and the type of iron species have  
no effect on the selectivity of methanol oxidation. However, they  
bear a significant influence on both the activity and selectivity  
in the reaction between methanol and **hydrogen**  
**sulfide**. The wet impregnation of NbMCM-41 and AlMCM-41  
with Fe(NO<sub>3</sub>)<sub>3</sub> leads to the most effective **catalysts** in  
the sulfurization of methanol.

IT 7439-89-6, Iron, uses  
RL: CAT (Catalyst use); USES (Uses)  
(preparation and activity of iron/metal MCM-41 **catalysts**  
in methanol oxidation and sulfurization reactions)

RN 7439-89-6 HCAPLUS

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and  
Waxes)

Section cross-reference(s): 67

ST iron **catalyst** metal MCM41 support prepn activity  
methanol oxidn; sulfurization methanol **hydrogen**  
**sulfide** iron metal zeolite **catalyst**

IT **Catalyst** supports  
(metal MCM-41; preparation and activity of iron/metal MCM-41  
**catalysts** in methanol oxidation and sulfurization  
reactions)

IT Oxidation **catalysts**  
Sulfidation **catalysts**  
(preparation and activity of iron/metal MCM-41 **catalysts**  
in methanol oxidation and sulfurization reactions)

IT Zeolite MCM-41  
 RL: CAT (Catalyst use); USES (Uses)  
 (support; preparation and activity of iron/metal MCM-41  
**catalysts** in methanol oxidation and sulfurization  
 reactions)

IT 74-82-8P, Methane, preparation 75-18-3P, Dimethyl  
**thioether** 115-10-6P, Dimethyl ether  
 RL: BYP (Byproduct); PREP (Preparation)  
 (preparation and activity of iron/metal MCM-41 **catalysts**  
 in methanol oxidation and sulfurization reactions)

IT 7439-89-6, Iron, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (preparation and activity of iron/metal MCM-41 **catalysts**  
 in methanol oxidation and sulfurization reactions)

IT 74-93-1P, **Methanethiol, preparation**  
 107-31-3P, Methyl formate  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (**preparation** and activity of iron/metal MCM-41  
**catalysts** in methanol oxidation and sulfurization  
 reactions)

IT 67-56-1, Methanol, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (preparation and activity of iron/metal MCM-41 **catalysts**  
 in methanol oxidation and sulfurization reactions)

IT 7440-03-1, Niobium, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (zeolite containing, support; preparation and activity of iron/metal  
 MCM-41 **catalysts** in methanol oxidation and sulfurization  
 reactions)

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L144 ANSWER 2 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2006:209715 HCAPLUS  
 DOCUMENT NUMBER: 144:292126  
 TITLE: Methods, compositions, and apparatuses for  
 forming macrocyclic compounds  
 INVENTOR(S): Johnson, Thomas E.; Fowler, Billy T.  
 PATENT ASSIGNEE(S): USA  
 SOURCE: PCT Int. Appl., 85 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2006025859	A2	20060309	WO 2005-US5028	2005 0217

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,  
 CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,  
 ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,  
 KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
 MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,  
 PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN,  
 TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,  
 HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK,  
 TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,  
 SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ,  
 TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: US 2004-545131P P

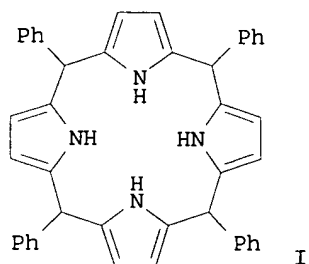
2004  
0217

US 2005-59796

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2005  
0217

GI



AB The invention is related to a process for manufacturing of at least one macrocyclic compound, e.g. tetraphenylporphyrin I, by (a) providing a reaction system comprising one or more reactants in a reaction medium, which are capable of forming the macrocycle through a desired reaction pathway that includes at least cyclization reaction(s), and which are further capable of forming undesired oligomers through at least one undesired reaction pathway that includes undesirable oligomerization reactions; and (b) modulating oligomerization reactions in the reaction medium, so as to reduce formation of the undesired oligomers and/or to reduce separation of the undesired oligomers from the reaction medium, relative to corresponding unmodulated oligomerization reactions. Oligomerization control additives are claimed. Cyclization solvents, and solvents that assist with spontaneous separation of the macrocycle from the reaction medium, are also claimed. Reaction of benzaldehyde with pyrrole in a reaction composition that contained about 37.5% by volume MeOH (precipitating solvent), 62.5% by volume H<sub>2</sub>O (oligomerization control additive), and 0.014 g/mL NaCl (separation additive) gave tetraphenylporphyrin I, in about 85% yield, compared to less than 1% in the absence of any oligomerization control. Prophetic examples of addnl. potential macrocyclic compds., e.g. porphyrins, macrocyclic imines, aryl boronates, crown ethers, cyclic peptides, etc., are also given and claimed.

IT **7783-06-4P**, Dihydrogen sulfide, preparation  
 RL: BYP (Byproduct); NUU (Other use, unclassified); RGT (Reagent);  
 PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
 (oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

IT **1333-74-0P**, Hydrogen, preparation  
 RL: BYP (Byproduct); RGT (Reagent); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)

reactions in the reaction medium)  
RN 1333-74-0 HCAPLUS  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT **20074-52-6D**, salts, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(use of separation additives, particularly salts, for spontaneous  
separation of the macrocycle from the reaction medium)  
RN 20074-52-6 HCAPLUS  
CN Iron, ion (Fe<sup>3+</sup>) (8CI, 9CI) (CA INDEX NAME)

Fe<sup>3+</sup>

CC 21-2 (General Organic Chemistry)  
Section cross-reference(s): 26, 28, 29, 34, 45  
IT Sulfones  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(aryl, macrocyclic aromatic **thioether** sulfone products;  
preparation of macrocyclic compds. via macro/cyclization by  
modulating oligomerization reactions in the reaction medium)  
IT **Acids**, preparation  
Group IIIA element compounds  
RL: BYP (Byproduct); IMF (Industrial manufacture); RCT (Reactant);  
RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent)  
(boronic **acids**; preparation of macrocyclic compds. via  
macrocyclization by modulating oligomerization reactions in the  
reaction medium)  
IT Carboxylic **acids**, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(containing ether terminal groups; precursors for macrocyclic  
lactone; preparation of macrocyclic compds. via macro/cyclization by  
modulating oligomerization reactions in the reaction medium)  
IT Carboxylic **acids**, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(dicarboxylic, precursors for macrocyclic dibutyltin  
dicarboxylate; preparation of macrocyclic compds. via  
macro/cyclization by modulating oligomerization reactions in  
the reaction medium)  
IT Alkyl halides  
Amino **acids**, preparation  
Bromides, preparation  
Disulfides  
Elements  
Inorganic compounds  
Organic compounds, preparation  
Organometallic compounds  
Peroxides, preparation  
Radicals, preparation  
Silanes  
Sulfates, preparation  
Sulfenic **acids**  
Sulfinic **acids**  
Sulfones  
Sulfoxides  
**Thiols**, preparation  
RL: BYP (Byproduct); RGT (Reagent); PREP (Preparation); RACT  
(Reactant or reagent)  
(oligomerization control additives; preparation of macrocyclic  
compds. via macrocyclization by modulating oligomerization  
reactions in the reaction medium)

- IT Peptides, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (peptides flanked with **thioether** and thiol terminal groups; precursors for macrocyclic cyclic peptides; preparation of macrocyclic compds. via macro/cyclization by modulating oligomerization reactions in the reaction medium)
- IT Sulfonic acids, preparation  
 RL: BYP (Byproduct); CAT (Catalyst use); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
 (preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT Aromatic compounds  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (sulfones, macrocyclic aromatic **thioether** sulfone products; preparation of macrocyclic compds. via macro/cyclization by modulating oligomerization reactions in the reaction medium)
- IT Rare earth metals, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (triflates; use of Lewis acids as cyclization catalyst in the preparation of porphyrinogens)
- IT 97-94-9, Triethylboron 109-63-7, Boron trifluoride etherate 373-57-9 7446-70-0, Aluminum chloride (AlCl<sub>3</sub>), uses 7647-17-8, Cesium chloride (CsCl), uses 7784-18-1, Aluminum fluoride (AlF<sub>3</sub>) 7788-97-8, Chromium fluoride (CrF<sub>3</sub>) 10025-82-8, Indium chloride (InCl<sub>3</sub>) 10038-98-9, Germanium chloride (GeCl<sub>4</sub>) 10099-58-8, Lanthanum chloride (LaCl<sub>3</sub>) 13465-55-9 19423-80-4, Europium trichloride hydrate 144026-79-9, Scandium triflate  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalyst; use of Lewis acids as cyclization catalyst in the preparation of porphyrinogens)
- IT 65-85-0, Benzoic acid, uses 75-75-2, Methanesulfonic acid 76-03-9, Trichloroacetic acid, uses 76-05-1, Trifluoroacetic acid, uses 79-09-4, Propionic acid, uses 98-11-3, Benzenesulfonic acid, uses 104-15-4, p-Toluenesulfonic acid, uses 1493-13-6, Triflic acid 3144-16-9, Camphor sulfonic acid  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalyst; use of protic acids as cyclization catalyst in the preparation of porphyrinogens)
- IT 50-00-0, Formol, uses 57-55-6, Propylene glycol, uses 60-29-7, Ethyl ether, uses 64-18-6, Formic acid, uses 67-63-0, Isopropanol, uses 67-66-3, Chloroform, uses 67-68-5, Dimethyl sulfoxide, uses 75-15-0, Carbon disulfide, uses 75-52-5, Nitromethane, uses 75-65-0, tert-Butanol, uses 78-83-1, Isobutanol, uses 78-93-3, Methyl ethyl ketone, uses 97-99-4 100-79-8, Solketal 107-21-1, Ethylene glycol, uses 108-88-3, Toluene, uses 109-86-4, Methyl cellosolve 109-99-9, Tetrahydrofuran, uses 110-71-4, Monoglyme 110-71-4D, Glyme, derivs. 110-80-5, Cellosolve 111-46-6, Diethylene glycol, uses 111-77-3, Methyl carbitol 111-90-0, Carbitol 111-96-6, Diglyme 112-25-4, Hexyl cellosolve 112-34-5, Butyl carbitol 112-35-6 112-36-7, Ethyl diglyme 112-49-2, Triglyme 112-50-5, Ethoxytriglycol 112-59-4, Hexyl carbitol 112-73-2, Dibutyl carbitol 123-91-1, 1,4-Dioxane, uses 124-16-3, 1-Butoxyethoxy-2-propanol 126-33-0, Sulfolane 138-86-3, Limonene 141-78-6, Ethyl acetate, uses 143-22-6, Butoxytriglycol 143-24-8, Tetraglyme 540-67-0, Methyl ethyl ether 680-31-9, Hexamethylphosphorictriamide, uses 872-50-4, N-Methyl-2-pyrrolidone, uses 5306-85-4, Dimethyl isosorbide 24800-44-0, Tripropylene glycol 25265-71-8, Dipropylene glycol 25322-68-3, Polyethylene glycol 25322-69-4, Polypropylene glycol 29387-86-8 30136-13-1 31692-85-0, Glycofurol 101063-18-7, Propasol DM 214210-60-3, Propasol M 879096-90-9, Hydrosolv  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (co-solvent; use of co-solvents for spontaneous separation of the macrocycle from the reaction medium)

- IT 7647-01-0P, Hydrochloric acid, preparation 7664-93-9P, Sulfuric acid, preparation 10035-10-6P, Hydrobromic acid, preparation  
 RL: BYP (Byproduct); CAT (Catalyst use); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
 (oligomerization control additive, **catalyst**; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 64-19-7P, Acetic acid, preparation  
 RL: BYP (Byproduct); CAT (Catalyst use); NUU (Other use, unclassified); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
 (oligomerization control additive; cyclization solvent; **catalyst**; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 62-53-3P, Aniline, preparation 124-38-9P, Carbon dioxide, preparation **7783-06-4P**, Dihydrogen sulfide, preparation  
 RL: BYP (Byproduct); NUU (Other use, unclassified); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
 (oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 50-21-5P, Lactic acid, preparation 50-99-7P, Glucose, preparation 57-48-7P, Fructose, preparation 58-64-0P, Adenosine diphosphate, preparation 58-97-9P, Uridine 5'-monophosphate, preparation 58-98-0P, Uridine diphosphate, preparation 59-23-4P, Galactose, preparation 61-19-8P, Adenosine 5'-monophosphate, preparation 63-37-6P, Cytidine 5'-monophosphate 63-38-7P, Cytidine diphosphate 74-85-1P, Ethylene, preparation 74-90-8P, Hydrogen cyanide, preparation 75-47-8P, Iodoform 75-75-2DP, Methylsulfonic acid, mesylates 85-32-5P, Guanosine 5'-monophosphate 100-51-6P, Benzyl alcohol, preparation 108-98-5P, Thiophenol, preparation 110-86-1P, Pyridine, preparation 123-56-8P, Succinimide 146-91-8P, Guanosine diphosphate 149-91-7P, Gallic acid, preparation 365-07-1P, Thymidine 5'-monophosphate 491-97-4P, Thymidine diphosphate 503-17-3P, 2-Butyne 556-64-9P, Methyl thiocyanate 630-08-0P, Carbon monoxide, preparation **1333-74-0P**, Hydrogen, preparation 1493-13-6DP, Triflic acid, triflates 2466-09-3P, Pyrophosphoric acid 6066-82-6P, N-Hydroxysuccinimide 7446-09-5P, Sulfur dioxide, preparation 7601-90-3P, Perchloric acid, preparation 7664-38-2P, Phosphoric acid, preparation 7727-37-9P, Nitrogen, preparation 7782-77-6P, Nitrous acid 7789-20-0P, Deuterium oxide 10034-85-2P, Hydroiodic acid 13444-71-8P, Periodic acid 77464-05-2P, N,N-Diisopropylurea  
 RL: BYP (Byproduct); RGT (Reagent); PREP (Preparation); RACT (Reactant or reagent)  
 (oligomerization control additive; preparation of macrocyclic compds. via macrocyclization by modulating oligomerization reactions in the reaction medium)
- IT 37116-97-5D, derivs.  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (precursors for macrocyclic aromatic **thioether** sulfones; preparation of macrocyclic compds. via macro/cyclization by modulating oligomerization reactions in the reaction medium)
- IT 4358-26-3D, salts 12033-49-7D, Nitrogen oxide (NO<sub>3</sub>), salts 13948-08-8D, Triphenylmethylium, salts 14100-65-3D, Metaborate (BO<sub>2</sub>-), salts 14265-45-3D, Sulfite, salts 14798-03-9D, Ammonium, salts 14808-79-8D, Sulfate, salts 14996-02-2D, Sulfate (HSO<sub>4</sub>-), salts 15158-11-9D, Copper(II), salts, uses 16887-00-6D, Chloride, salts 16984-48-8D, Fluoride, salts 17341-25-2D, Sodium cation, salts, uses **20074-52-6D**, salts, uses 20461-54-5D, Iodide, salts 22537-22-0D, Magnesium



cation, salts, uses 23713-49-7D, Zinc cation, salts, uses  
24203-36-9D, Potassium cation, salts, uses 24959-67-9D, Bromide,  
salts 25215-10-5D, Guanidinium, salts 32589-80-3D,  
Tetramethylphosphonium, salts  
RL: NUU (Other use, unclassified); USES (Uses)  
(use of separation additives, particularly salts, for spontaneous  
separation of the macrocycle from the reaction medium)

L144 ANSWER 3 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:258611 HCAPLUS

DOCUMENT NUMBER: 142:317514

TITLE: Acid-catalyzed thiolation process  
for the manufacture of  
tertiary-dodecyl mercaptan from  
dodecenes and hydrogen  
sulfide

INVENTOR(S): Faderl, Juergen; Mueller, Christian; Stephan,  
Juergen; Steinbrenner, Ulrich; Birkert,  
Oliver; Walther, Bernd-Peter; Gmeiner,  
Wolfgang; Maas, Heiko; Schaedler, Volker;  
Brand, Alexandra

PATENT ASSIGNEE(S): BASF AG, Germany

SOURCE: Ger. Offen., 12 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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DE 10340252	A1	20050324	DE 2003-10340252	2003 0829
WO 2005030710	A1	20050407	WO 2004-EP7862	2004 0715

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,  
CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,  
ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,  
KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,  
PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,  
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH,  
CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,  
MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI,  
CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: DE 2003-10340252 A

2003  
0829

AB A non-odorous tert.-dodecyl mercaptan, suitable as a  
chain-transfer agent, is obtained by the acid-catalyzed  
addition of hydrogen sulfide to a C12 alkene  
mixture containing 10-18% linear dodecane-derived olefins, 25-40%  
5-methylundecane-derived olefins, 25-40% 4-ethyldecane-derived  
olefins, 2-8% 5,6-dimethyldecane-derived olefins, 5-12%  
5-ethyl-6-methylnonane-derived olefins, 1-5% 4,5-diethyloctane-  
derived olefins and ≤5% other hydrocarbons.

IT 7783-06-4DP, Hydrogen sulfide,  
tertiary-dodecyl mercaptan reaction products  
with C12 alkenes

RL: IMF (Industrial manufacture); PRP (Properties); PREP

## (Preparation)

(acid-catalyzed thiolation process for the  
**manufacture** of tertiary-dodecyl **mercaptan** from  
dodecenes and **hydrogen sulfide**)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H2S

IT 7440-02-0, Nickel, uses

RL: CAT (Catalyst use); USES (Uses)  
(dimerization **catalyst**)

RN 7440-02-0 HCAPLUS

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IC ICM C07C321-04

ICS C07C319-04; C07C006-04

CC 37-2 (Plastics Manufacture and Processing)

Section cross-reference(s): 23, 45

ST **thiolation manuf** tertiary dodecyl

**mercaptan**; chain transfer agent tertiary dodecyl  
**mercaptan**

IT Alkenes, **preparation**

RL: IMF (Industrial manufacture); PRP (Properties); PREP  
(Preparation)

(C12, addition products with **hydrogen sulfide**;  
acid-catalyzed thiolation process for the  
**manufacture** of tertiary-dodecyl **mercaptan** from  
dodecenes and **hydrogen sulfide**)

IT Addition reaction

Addition reaction **catalysts**

(acid-catalyzed thiolation process for the  
**manufacture** of tertiary-dodecyl **mercaptan** from  
dodecenes and **hydrogen sulfide**)

IT Acids, uses

RL: CAT (Catalyst use); USES (Uses)

(acid-catalyzed thiolation process for the  
**manufacture** of tertiary-dodecyl **mercaptan** from  
dodecenes and **hydrogen sulfide**)

IT Chain transfer agents

(tertiary-dodecyl **mercaptan**; acid-catalyzed  
thiolation process for the **manufacture** of tertiary-dodecyl  
**mercaptan** from dodecenes and **hydrogen**  
**sulfide**)

IT **Thiols, preparation**

RL: IMF (Industrial manufacture); PRP (Properties); PREP  
(Preparation)

(tertiary-dodecyl **mercaptans**; acid-catalyzed  
thiolation process for the **manufacture** of tertiary-dodecyl  
**mercaptan** from dodecenes and **hydrogen**  
**sulfide**)

IT 112-40-3DP, Dodecane, alkenes, tertiary-dodecyl **mercaptan**reaction **products** with H2S 1632-70-8DP,5-Methylundecane, alkenes, tertiary-dodecyl **mercaptan**reaction **products** with H2S 1636-41-5DP,4,5-Diethyloctane, alkenes, tertiary-dodecyl **mercaptan**reaction **products** with H2S 1636-43-7DP,5,6-Dimethyldecane, alkenes, tertiary-dodecyl **mercaptan**reaction **products** with H2S 1636-44-8DP,4-Ethyldecane, alkenes, tertiary-dodecyl **mercaptan**

reaction products with H<sub>2</sub>S 7783-06-4DP  
 , Hydrogen sulfide, tertiary-dodecyl  
 mercaptan reaction products with C<sub>12</sub> alkenes  
 25103-58-6P, tert-Dodecanethiol 62184-46-7DP, alkenes,  
 tertiary-dodecyl mercaptan reaction products  
 with H<sub>2</sub>S  
 RL: IMF (Industrial manufacture); PRP (Properties); PREP  
 (Preparation)

(acid-catalyzed thiolation process for the  
 manufacture of tertiary-dodecyl mercaptan from  
 dodecenes and hydrogen sulfide)

IT 592-41-6DP, Hexene, C<sub>12</sub> dimerization products,  
 tertiary-dodecyl mercaptan reaction products  
 with H<sub>2</sub>S

RL: IMF (Industrial manufacture); RCT (Reactant); PREP  
 (Preparation); RACT (Reactant or reagent)

(acid-catalyzed thiolation process for the  
 manufacture of tertiary-dodecyl mercaptan from  
 dodecenes and hydrogen sulfide)

IT 7440-02-0, Nickel, uses

RL: CAT (Catalyst use); USES (Uses)  
 (dimerization catalyst)

L144 ANSWER 4 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:1127159 HCAPLUS

DOCUMENT NUMBER: 142:56819

TITLE: Chemoselective hydrogenation catalysts  
 and their use in a process for the removal of  
 alkynes and alkadienes from alkenes  
 INVENTOR(S): Bergmeister, Joseph J.; Delzer, Gary A.;  
 Cheung, Tin-Tack P.

PATENT ASSIGNEE(S): Chevron Phillips Chemical Company CPChem, USA

SOURCE: U.S. Pat. Appl. Publ., 6 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
US 2004260131	A1	20041223	US 2003-600609	2003 0623
AU 2004251156	A1	20050106	AU 2004-251156	2004 0527
CA 2529940	AA	20050106	CA 2004-2529940	2004 0527
WO 2005000773	A1	20050106	WO 2004-US16580	2004 0527

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,  
 CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,  
 ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,  
 KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
 MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,  
 PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,  
 TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW  
 RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
 ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH,  
 CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,  
 MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI,  
 CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

EP 1651585 A1 20060503 EP 2004-753411 2004  
0527

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,  
MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK  
CN 1809521 A 20060726 CN 2004-80017411

2004  
0527

PRIORITY APPLN. INFO.: US 2003-600609 A 2003  
0623

WO 2004-US16580 W 2004  
0527

OTHER SOURCE(S): MARPAT 142:56819

AB Chemoselective hydrogenation **catalysts** and their use in  
a process for the removal of alkynes and alkadienes from alkenes  
are described. The **catalyst** composition comprises palladium,  
silver, potassium, and an inorg. support material, where the  
**catalyst** composition contains <0.3% potassium. In the presence  
of sulfur-containing impurities (e.g., COS), these **catalysts**  
yield a much smaller increase in T1 (cleanup temperature) and higher  
ethylene selectivity is achieved (i.e., hydrogenation of acetylene  
into ethylene).

IT 7783-06-4, **Hydrogen sulfide**, uses  
RL: CAT (Catalyst use); USES (Uses)  
(**catalyst** component; chemoselective hydrogenation  
**catalysts** and their use in a process for the removal of  
alkynes and alkadienes from alkenes)

RN 7783-06-4 HCAPLUS  
CN Hydrogen sulfide (H2S) (8CI, 9CI) (CA INDEX NAME)

H2S

IT 7440-05-3, Palladium, uses  
RL: CAT (Catalyst use); USES (Uses)  
(in chemoselective hydrogenation **catalysts** and their  
use in a process for the removal of alkynes and alkadienes from  
alkenes)  
RN 7440-05-3 HCAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

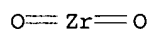
IT 1333-74-0, **Hydrogen, reactions**  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(in chemoselective hydrogenation **catalysts** and their  
use in a process for the removal of alkynes and alkadienes from  
alkenes)  
RN 1333-74-0 HCAPLUS  
CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 1314-23-4, Zirconia, uses 1344-28-1,  
Alumina, uses 7631-86-9, Silica, uses  
13463-67-7, Titania, uses  
RL: CAT (Catalyst use); USES (Uses)

(support; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

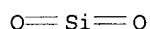
RN 1314-23-4 HCAPLUS  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



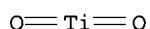
RN 1344-28-1 HCAPLUS  
CN Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 7631-86-9 HCAPLUS  
CN Silica (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



RN 13463-67-7 HCAPLUS  
CN Titanium oxide (TiO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IC ICM C07C005-03  
INCL 585259000

CC 35-2 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 48, 67

ST alkyne alkadiene chemoselective **catalytic** hydrogenation  
alkene purifn; acetylene alkadiene chemoselective  
**catalytic** hydrogenation alkene purifn

IT Disulfides

**Thioethers**

Thiols, uses

RL: CAT (Catalyst use); USES (Uses)

(**catalyst** components; in chemoselective hydrogenation  
**catalysts** and their use in a process for the removal of  
alkynes and alkadienes from alkenes)

IT Chemoselectivity

(chemoselective hydrogenation **catalysts** and their use  
in a process for the removal of alkynes and alkadienes from  
alkenes)

IT Alkenes, preparation

RL: IMF (Industrial manufacture); PEP (Physical, engineering or  
chemical process); PUR (Purification or recovery); PYP (Physical  
process); PREP (Preparation); PROC (Process)

(chemoselective hydrogenation **catalysts** and their use  
in a process for the removal of alkynes and alkadienes from  
alkenes)

IT Alkadienes

Alkynes

Cycloalkadienes

RL: RCT (Reactant); RACT (Reactant or reagent)

(chemoselective hydrogenation **catalysts** and their use  
in a process for the removal of alkynes and alkadienes from  
alkenes)

IT Hydrogenation

Hydrogenation **catalysts**

(chemoselective; chemoselective hydrogenation **catalysts**  
and their use in a process for the removal of alkynes and  
alkadienes from alkenes)

IT Aluminosilicates, uses

RL: CAT (Catalyst use); USES (Uses)

(support; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 75-15-0, Carbon disulfide, uses 463-58-1, Carbonyl sulfide

7783-06-4, Hydrogen sulfide, uses

RL: CAT (Catalyst use); USES (Uses)

(**catalyst** component; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 74-86-2, Acetylene, reactions 74-99-7, Propyne 77-73-6, Dicyclopentadiene 78-79-5, Isoprene, reactions 106-99-0, 1,3-Butadiene, reactions 107-00-6, 1-Butyne 463-49-0, Allene 503-17-3, 2-Butyne 504-60-9, 1,3-Pentadiene 513-81-5, 2,3-Dimethyl-1,3-butadiene 542-92-7, Cyclopentadiene, reactions 590-19-2, 1,2-Butadiene 591-93-5, 1,4-Pentadiene 591-95-7, 1,2-Pentadiene 592-42-7, 1,5-Hexadiene 592-44-9, 1,2-Hexadiene 592-45-0, 1,4-Hexadiene 592-48-3, 1,3-Hexadiene 598-23-2, 3-Methyl-1-butyne 627-19-0, 1-Pentyne 628-71-7, 1-Heptyne 629-05-0, 1-Octyne 693-02-7, 1-Hexyne 764-93-2, 1-Decyne 1118-58-7, 2-Methyl-1,3-pentadiene 3452-09-3, 1-Nonyne

RL: RCT (Reactant); RACT (Reactant or reagent)

(chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 7440-05-3, Palladium, uses 7440-09-7, Potassium, uses

7440-22-4, Silver, uses 7789-23-3, Potassium fluoride

20667-12-3, Silver oxide

RL: CAT (Catalyst use); USES (Uses)

(in chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 1333-74-0, Hydrogen, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(in chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

IT 1314-23-4, Zirconia, uses 1344-28-1,

Alumina, uses 7631-86-9, Silica, uses

12651-25-1, Zinc titanate 13463-67-7, Titania, uses

37275-76-6, Zinc aluminate

RL: CAT (Catalyst use); USES (Uses)

(support; chemoselective hydrogenation **catalysts** and their use in a process for the removal of alkynes and alkadienes from alkenes)

L144 ANSWER 5 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:737421 HCAPLUS

DOCUMENT NUMBER: 139:262461

TITLE: Preparation of a stable cobalt-phosphine hydroformylation **catalyst** containing sulfur compounds which suppress the formation of cobalt carbide in the reaction mixture

INVENTOR(S): Arnoldy, Peter; Ellison, Robert Hardy; Kuipers, Herman Pieter Charles Eduard; Moene, Robert; Van Der Steen, Frederik Hendrik

PATENT ASSIGNEE(S): Shell Oil Company, Neth.

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2003176742      A1      20030918      US 2002-294320
                                                    2002
                                                    1114

US 6777579         B2      20040817
CA 2466946         AA      20031002      CA 2002-2466946
                                                    2002
                                                    1114

WO 2003080550      A1      20031002      WO 2002-EP12857
                                                    2002
                                                    1114

W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
    CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
    GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
    KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
    MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE,
    SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
    VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
    AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
    DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,
    SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,
    MR, NE, SN, TD, TG
AU 2002367794      A1      20031008      AU 2002-367794
                                                    2002
                                                    1114

EP 1444187         A1      20040811      EP 2002-807099
                                                    2002
                                                    1114

EP 1444187         B1      20060329
R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
    MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
    EE, SK
CN 1589251         A      20050302      CN 2002-822713
                                                    2002
                                                    1114

JP 2005519973      T2      20050707      JP 2003-578310
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AT 321746          E      20060415      AT 2002-807099
                                                    2002
                                                    1114

ES 2256592         T3      20060716      ES 2002-2807099
                                                    2002
                                                    1114

ZA 2004003232      A      20050120      ZA 2004-3232
                                                    2004
                                                    0429

PRIORITY APPLN. INFO.:      US 2001-332809P      P
                                                    2001
                                                    1114

                                WO 2002-EP12857      W
                                                    2002
                                                    1114

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OTHER SOURCE(S): MARPAT 139:262461

AB A hydroformylation process is described that involves reacting a compound having at least one olefinic carbon-carbon double bond with hydrogen and carbon monoxide in the presence of a cobalt catalyst and a sulfur-containing additive (e.g., thiophene) which suppresses the formation of cobalt carbide in the reaction mixture

IT 1333-74-0, Hydrogen, uses 7440-48-4, Cobalt, uses 7783-06-4, Hydrogen sulfide, uses

RL: CAT (Catalyst use); USES (Uses)  
 (in the preparation of a stable cobalt-phosphine hydroformylation  
**catalyst** containing sulfur compds. which suppress the  
 formation of cobalt carbide in the reaction mixture)

RN 1333-74-0 HCAPLUS

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

RN 7440-48-4 HCAPLUS

CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

IC ICM C07C045-49

ICS C07C029-16; C07C029-15

INCL 568429000; 568909000

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and  
 Waxes)

Section cross-reference(s): 67

ST cobalt hydroformylation **catalyst** prepn; carbide cobalt  
 formation suppression hydroformylation **catalyst** prepn

IT Synthesis gas

(H<sub>2</sub>-CO mixts.; in the preparation of a stable  
 cobalt-phosphine hydroformylation **catalyst** containing  
 sulfur compds. which suppress the formation of cobalt carbide  
 in the reaction mixture)

IT Phosphines

RL: CAT (Catalyst use); USES (Uses)

(bicyclic; in the preparation of a stable cobalt-phosphine  
 hydroformylation **catalyst** containing sulfur compds. which  
 suppress the formation of cobalt carbide in the reaction mixture)

IT Hydroformylation **catalysts**

(preparation of a stable cobalt-phosphine hydroformylation  
**catalyst** containing sulfur compds. which suppress the  
 formation of cobalt carbide in the reaction mixture)

IT Disulfides

Sulfides, uses

**Thioethers**

RL: CAT (Catalyst use); USES (Uses)

(preparation of a stable cobalt-phosphine hydroformylation  
**catalyst** containing sulfur compds. which suppress the  
 formation of cobalt carbide in the reaction mixture)

IT Organic compounds, uses

RL: CAT (Catalyst use); USES (Uses)

(sulfur-containing; preparation of a stable cobalt-phosphine  
 hydroformylation **catalyst** containing sulfur compds. which  
 suppress the formation of cobalt carbide in the reaction mixture)

IT 92-85-3, Thianthrene 110-02-1, Thiophene 132-65-0,  
 Dibenzothiophene 136-52-7, Cobalt octoate 624-92-0, Dimethyl  
 disulfide 630-08-0, Carbon monoxide, uses 1313-82-2, Sodium  
 sulfide, uses 1333-74-0, Hydrogen, uses  
 7440-48-4, Cobalt, uses 7783-06-4,  
 Hydrogen sulfide, uses 16721-80-5, Sodium  
 bisulfide



RL: CAT (Catalyst use); USES (Uses)  
 (in the preparation of a stable cobalt-phosphine hydroformylation  
**catalyst** containing sulfur compds. which suppress the  
 formation of cobalt carbide in the reaction mixture)

IT 51177-04-9P, Cobalt carbide

RL: BYP (Byproduct); PREP (Preparation)  
 (preparation of a stable cobalt-phosphine hydroformylation  
**catalyst** containing sulfur compds. which suppress the  
 formation of cobalt carbide in the reaction mixture)

IT 13886-99-2

RL: CAT (Catalyst use); USES (Uses)  
 (preparation of a stable cobalt-phosphine hydroformylation  
**catalyst** containing sulfur compds. which suppress the  
 formation of cobalt carbide in the reaction mixture)

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L144 ANSWER 6 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:610442 HCAPLUS

DOCUMENT NUMBER: 137:155051

TITLE: **Preparation of  
 silylorganomercaptans by  
 catalyzed hydrogenolysis of  
 disulfides, trisulfides, and polysulfides**

INVENTOR(S): Gedon, Steven C.; Hale, Melinda

PATENT ASSIGNEE(S): Crompton Corporation, USA

SOURCE: U.S., 6 pp.

CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
US 6433206	B1	20020813	US 2001-12286	2001 1115
WO 2003040153	A1	20030515	WO 2002-US32608	2002 1011
W: BR, CA, CN, JP, KR				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,				
IE, IT, LU, MC, NL, PT, SE, SK, TR				
EP 1448570	A1	20040825	EP 2002-769065	2002 1011
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,				
MC, PT, IE, FI, CY, TR, BG, CZ, EE, SK				
BR 2002014066	A	20041013	BR 2002-14066	2002 1011
JP 2005510520	T2	20050421	JP 2003-542198	2002 1011
PRIORITY APPLN. INFO.:			US 2001-12286	A 2001 1115
			WO 2002-US32608	W 2002 1011

AB Organomercaptans of type (R1)3-Si-R2-SH [wherein R1 = (C1-C6)alkyl, (C1-C10)aryl, (C1-C6)alkoxy, or at least two of R1 and the silicon atom to which they are bonded form a ring system having up to about 12 ring members with no ethylenic unsatn. and optionally containing one or more heteroatoms selected from the group consisting of O, S, or N; R2 = divalent hydrocarbon group containing no ethylenic unsatn. and having up to about 20 carbon atoms] are prepared by reacting sulfides of general formula [(R1)3-Si-R2-S2Sm (m = 0-8) with hydrogen under hydrogenolysis conditions in the presence of a **catalytically** effective amount of Group VIII metal **catalyst** and in the presence of a **catalyst** poisoning inhibiting amount of a **catalyst** poisoning inhibitory agent selected from the group consisting of water, except where the **mercaptan product** contains at least one hydrolyzable silane group, (C1-C6)alkanol, H2S, and mixts. thereof. Thus, bis(3-triethoxysilylpropyl)disulfide undergoes hydrogenolysis catalyzed by nickel in the presence of ethanol to give 77.33 weight % of the corresponding **mercaptan**.

IT 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-48-4, Cobalt, uses  
RL: CAT (Catalyst use); USES (Uses)  
(preparation of silylorganomercaptans by catalyzed hydrogenolysis of disulfides, trisulfides, and polysulfides)

RN 7440-02-0 HCAPLUS  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-05-3 HCAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS  
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS  
CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-18-8 HCAPLUS  
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-48-4 HCAPLUS  
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

IC ICM C07R007-08

INCL 556627000

CC 29-6 (Organometallic and Organometalloidal Compounds)

Section cross-reference(s): 45

ST **silylorganomercaptan prepn; sulfide**hydrogenolysis Group VIII **catalyst**

IT Hydrogenolysis

Hydrogenolysis **catalysts**(preparation of **silylorganomercaptans** by  
**catalyzed** hydrogenolysis of disulfides, trisulfides,  
and polysulfides)

IT Sulfides, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(preparation of **silylorganomercaptans** by  
**catalyzed** hydrogenolysis of disulfides, trisulfides,  
and polysulfides)IT **Thiols, preparation**

RL: IMF (Industrial manufacture); SPN (Synthetic preparation);

PREP (Preparation)

(silylorganomercaptans; preparation of  
**silylorganomercaptans** by **catalyzed**  
hydrogenolysis of disulfides, trisulfides, and polysulfides)

IT 1307-96-6, Cobalt oxide, uses 1313-27-5, Molybdenum trioxide,

uses 7440-02-0, Nickel, uses 7440-05-3,

Palladium, uses 7440-06-4, Platinum, uses

7440-16-6, Rhodium, uses 7440-18-8, Ruthenium,

uses 7440-48-4, Cobalt, uses

RL: CAT (Catalyst use); USES (Uses)

(preparation of **silylorganomercaptans** by  
**catalyzed** hydrogenolysis of disulfides, trisulfides,  
and polysulfides)

IT 14814-09-6P, 3-Mercaptopropyltriethoxysilane

60764-86-5P, Bis(3-(triethoxysilylpropyl)sulfide

RL: IMF (Industrial manufacture); SPN (Synthetic preparation);

PREP (Preparation)

(preparation of **silylorganomercaptans** by  
**catalyzed** hydrogenolysis of disulfides, trisulfides,  
and polysulfides)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0,

Isopropanol, uses 71-23-8, Propanol, uses 71-36-3, Butanol,

uses 78-83-1, Isobutanol, uses 7732-18-5, Water, uses

RL: NUU (Other use, unclassified); USES (Uses)

(preparation of **silylorganomercaptans** by  
**catalyzed** hydrogenolysis of disulfides, trisulfides,  
and polysulfides)

IT 35112-74-4, Bis[3-(trimethoxysilyl)propyl] disulfide 40372-72-3,

[Bis(3-triethoxysilyl)propyl]tetrasulfide 40550-17-2,

Bis[(3-trimethoxysilyl)propyl]trisulfide 41453-78-5,

Bis[3-(trimethoxysilyl)propyl]tetrasulfide 42169-82-4,

Bis[3-(tributoxysilyl)propyl] disulfide 56706-10-6,

Bis(3-triethoxysilylpropyl) disulfide 56706-11-7,

Bis[3-(triethoxysilyl)propyl]trisulfide 57640-06-9 57640-07-0

57640-08-1 57640-12-7 57640-13-8 63501-62-2 63501-63-3

68704-61-0 70253-72-4 89552-63-6, 3-(Tributoxysilyl)propyl

3-(trimethoxysilyl)propyl trisulfide 89552-64-7 137264-06-3

167216-77-5 170573-43-0 170573-44-1 180003-68-3

180003-70-7 180003-74-1 180003-75-2 180003-77-4

180003-88-7 180003-90-1 180003-91-2 180003-92-3

180004-00-6 180007-08-3 182814-38-6 182814-43-3

188561-27-5 203457-58-3 243458-27-7 243458-31-3

RL: RCT (Reactant); RACT (Reactant or reagent)

(preparation of **silylorganomercaptans** by  
**catalyzed** hydrogenolysis of disulfides, trisulfides,

and polysulfides)

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L144 ANSWER 7 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1991:470742 HCAPLUS

DOCUMENT NUMBER: 115:70742

TITLE: Hydrogen, **hydrogen sulfide**  
and hydrocarbon coadsorption on platinum(111)  
and platinum(110): selective **formation**  
of **alkylthiols**

AUTHOR(S): Vassilakis, D.; Pradier, C. M.; Berthier, Y.;  
Oudar, J.

CORPORATE SOURCE: Lab. Phys. Chim. Surf., Ec. Natl. Super. Chim.  
Paris, Paris, 75005, Fr.

SOURCE: Applied Surface Science (1991), 47(3), 273-80  
CODEN: ASUSEE; ISSN: 0169-4332

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Simultaneous adsorption of diolefin, hydrogen, and  
**hydrogen sulfide** on platinum single crystals  
induces **mercaptan** and alkane **formation**. The  
nature, the amount and the temperature of desorption of these products  
depend on the size and configuration of the diolefin and on the  
structure of the surface. Mechanisms have been proposed to  
interpret the observed surface reactions. Compds. are selectively  
produced when **H<sub>2</sub>S** reacts first with the diolefin; this  
occurs with C<sub>4</sub>H<sub>6</sub> on both (111) and (110) orientations and with  
C<sub>3</sub>H<sub>8</sub> on Pt(110). But hydrogen is the 1st to react with C<sub>5</sub>H<sub>8</sub> on  
Pt(111), leading thus to a whole series of **mercaptans**  
and saturated hydrocarbons.

IT 7783-06-4, **Hydrogen sulfide**,  
properties

RL: RCT (Reactant); RACT (Reactant or reagent)

(coadsorption and reaction of, with dihydrogen, and alkadienes  
over platinum, mechanism of)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

IT 1333-74-0, Dihydrogen, properties

RL: RCT (Reactant); RACT (Reactant or reagent)

(coadsorption and reaction of, with **hydrogen**  
**sulfide** and alkadienes over platinum, mechanism of)

RN 1333-74-0 HCAPLUS

CN Hydrogen (8CI, 9CI) (CA INDEX NAME)

H-H

IT 7440-06-4, Platinum, properties

RL: PRP (Properties)

(coadsorption of dihydrogen, **hydrogen sulfide**  
, and alkadienes on)

RN 7440-06-4 HCAPLUS

CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

- CC 22-7 (Physical Organic Chemistry)  
 ST dihydrogen **hydrogen sulfide** alkadiene  
 coadsorption platinum; alkyl thiol; **mercaptan**  
 IT Alkadienes  
 RL: PRP (Properties)  
 (coadsorption of, with **hydrogen sulfide** and  
 dihydrogen on platinum, mechanism of **alkylthiol**  
**formation** from)  
 IT Surface structure  
 (effect of, on reaction between dihydrogen, **hydrogen**  
**sulfide**, and alkadienes on platinum)  
 IT Reaction mechanism  
 (for reaction between alkadienes, dihydrogen, and  
**hydrogen sulfide** over platinum)  
 IT Alkanes, preparation  
**Thiols, preparation**  
 RL: PREP (Preparation)  
 (from coadsorption of **hydrogen sulfide** and  
 alkadienes on platinum, mechanism of)  
 IT Redox reaction  
 (of dihydrogen, **hydrogen sulfide**, and  
 alkadienes over platinum, mechanism of)  
 IT Redox reaction **catalysts**  
 (platinum, for dihydrogen, **hydrogen sulfide**  
 , and alkadienes, mechanism with)  
 IT **Catalysts and Catalysis**  
 (platinum, for reactions of alkadienes, dihydrogen, and  
**hydrogen sulfide**)  
 IT Electron emission  
 (Auger, of carbon- and sulfur-platinum signals, reaction of  
 dihydrogen, with **hydrogen sulfide** and  
 alkadienes over platinum surface in relation to)  
 IT Adsorption  
 (co-, of dihydrogen, **hydrogen sulfide**, and  
 alkadienes on platinum)  
 IT 78-79-5, properties 106-99-0, 1,3-Butadiene, properties  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (coadsorption and reaction of, with dihydrogen and  
**hydrogen sulfide** over platinum, mechanism of)  
 IT 7783-06-4, **Hydrogen sulfide**,  
 properties  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (coadsorption and reaction of, with dihydrogen, and alkadienes  
 over platinum, mechanism of)  
 IT 1333-74-0, Dihydrogen, properties  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (coadsorption and reaction of, with **hydrogen**  
**sulfide** and alkadienes over platinum, mechanism of)  
 IT 7440-06-4, Platinum, properties  
 RL: PRP (Properties)  
 (coadsorption of dihydrogen, **hydrogen sulfide**  
 , and alkadienes on)  
 IT 74-82-8P, Methane, preparation 74-84-0P, Ethane, preparation  
 74-93-1P, Methyl **mercaptan**, **preparation**  
 75-08-1P, Ethyl **mercaptan** 106-97-8P, Butane,  
 preparation 107-03-9P, Propyl **mercaptan** 109-66-0P,  
 Pentane, preparation 109-79-5P, 1-**Butanethiol**  
 110-66-7P, 1-**Pentanethiol** 111-31-9P, 1-  
**Hexanethiol**  
 RL: FORM (Formation, nonpreparative); PREP (Preparation)  
 (**formation** of, from alkadiene, dihydrogen, and  
**hydrogen sulfide** over platinum, desorption  
 and mechanism of)

DOCUMENT NUMBER: 112:77339  
TITLE: Very active zeolites as useful  
**catalysts** in the chemistry of highly  
sensitive compounds  
AUTHOR(S): Hoelderich, Wolfgang; Hesse, Michael; Sattler,  
Ewald  
CORPORATE SOURCE: Ammonia Lab., BASF, Ludwigshafen, 6700, Fed.  
Rep. Ger.  
SOURCE: Proc. - Int. Congr. Catal., 9th (1988), Volume  
1, 316-23. Editor(s): Phillips, M. J.;  
Ternan, M. Chem. Inst. Can.: Ottawa, Ont.  
CODEN: 56NZA9  
DOCUMENT TYPE: Conference  
LANGUAGE: English

AB Amines and **mercaptans** can be **synthesized** from  
olefins and NH<sub>3</sub> or H<sub>2</sub>S in the presence of zeolite  
**catalysts**. Reactions of phosphines and silanes with  
olefins in the presence of zeolites and aluminum phosphates (  
**prepared** hydrothermally or by precipitation) were examined Addition of  
phosphines to olefinic double bonds gives higher yields than in  
the case of amination, and the results obtained with zeolites are  
superior to those achieved with phosphates. In hydrosilylations,  
too, zeolites are superior to phosphates but they do not offer  
such advantages over conventional **catalysts** as in the  
case of phosphorylation.

IT 7440-06-4, Platinum, uses and miscellaneous  
7440-16-6, Rhodium, uses and miscellaneous  
7440-48-4, Cobalt, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from zeolite containing, for the addition of  
phosphines and silanes to olefins)

RN 7440-06-4 HCAPLUS

CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-16-6 HCAPLUS

CN Rhodium (8CI, 9CI) (CA INDEX NAME)

Rh

RN 7440-48-4 HCAPLUS

CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

CC 29-7 (Organometallic and Organometalloidal Compounds)

Section cross-reference(s): 67, 78

ST phosphine addn olefin zeolite **catalyst**; organophosphine  
synthesis zeolite **catalyst**; silane addn olefin zeolite  
**catalyst**

IT Alkenes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolite-**catalyzed** addition reactions of, with  
phosphines and silanes)

IT Hydrosilylation

(zeolite-**catalyzed**, of olefins)

IT Addition reaction **catalysts**

(zeolites, for the addition of phosphines and silanes to alkenes)

IT Zeolites, uses and miscellaneous

- RL: CAT (Catalyst use); USES (Uses)  
(Al, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT Zeolites, uses and miscellaneous  
RL: USES (Uses)  
(Cr, boron-substituted, chromium-impregnated, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT Zeolites, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(Fe, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT Zeolites, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(boron-substituted, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 7440-06-4, Platinum, uses and miscellaneous  
7440-16-6, Rhodium, uses and miscellaneous  
7440-48-4, Cobalt, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from zeolite containing, for the addition of phosphines and silanes to olefins)
- IT 7664-38-2, Phosphoric acid, uses and miscellaneous 7784-30-7  
10043-35-3, Boric acid (H<sub>3</sub>BO<sub>3</sub>), uses and miscellaneous  
12736-95-7, Aluminum phosphate silicate 15438-04-7  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, for the addition of phosphines and silanes to olefins)
- IT 593-68-0P 822-68-4P 2501-94-2P 4538-29-8P 15573-36-1P  
95837-79-9P 120167-54-6P 120167-55-7P  
RL: FORM (Formation, nonpreparative); PREP (Preparation)  
(formation of, from zeolite-**catalyzed** addition of phosphines to olefins)
- IT 5037-65-0P 29681-57-0P  
RL: FORM (Formation, nonpreparative); PREP (Preparation)  
(formation of, from zeolite-**catalyzed** addition of silane to olefin)
- IT 593-54-4 993-07-7 1111-74-6 7803-51-2, Phosphine  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolite-**catalyzed** addition reaction of, to olefin or diene)
- IT 74-85-1, Ethene, reactions 110-83-8, Cyclohexene, reactions  
115-07-1, 1-Propene, reactions 115-11-7, reactions 142-29-0, Cyclopentene 627-58-7 628-41-1, 1,4-Cyclohexadiene  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolite-**catalyzed** addition reaction of, with phosphines)
- IT 1335-30-4  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolites, Al, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 1335-30-4  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolites, Cr, boron-substituted, chromium-impregnated, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 1335-30-4  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolites, Fe, **catalysts**, for the addition of phosphines and silanes to olefins)
- IT 1335-30-4  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(zeolites, boron-substituted, **catalysts**, for the addition of phosphines and silanes to olefins)

L144 ANSWER 9 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1971:476139 HCAPLUS

DOCUMENT NUMBER: 75:76139  
 TITLE: Conversion of alkyl **mercaptans** to  
 olefins and **hydrogen sulfide**  
 INVENTOR(S): Larsen, Arthur L.  
 PATENT ASSIGNEE(S): Marathon Oil Co.  
 SOURCE: U.S., 2 pp.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 3591652	A	19710706	US 1968-755434	1968 0826

PRIORITY APPLN. INFO.: US 1968-755434 A  
 1968  
 0826

AB C<sub>2</sub>H<sub>4</sub> and H<sub>2</sub>S were obtained in high yield by contacting EtSH (I) with an Fe **catalyst**. Thus, I was passed at 0.25 ml/min through a pipe packed with Fe wool at 350°, and contact time at least 0.5 min to give 98% conversion into high quality C<sub>2</sub>H<sub>4</sub>.

IT **7439-89-6**, uses and miscellaneous  
 RL: CAT (Catalyst use); USES (Uses)  
 (**catalysts**, for ethanethiol conversion into ethylene)

RN 7439-89-6 HCAPLUS

CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

IC C07C

INCL 260677000

CC 23 (Aliphatic Compounds)

ST ethylene manuf; **mercaptan catalyst** olefin  
**prepn**

IT **Catalysts**  
 (iron, for ethanethiol conversion into ethylene)

IT **7439-89-6**, uses and miscellaneous  
 RL: CAT (Catalyst use); USES (Uses)  
 (**catalysts**, for ethanethiol conversion into ethylene)

IT 75-08-1  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (ethylene from, **catalysts** for)

IT 74-85-1P, **preparation**  
 RL: PREP (Preparation)  
 (from **ethanethiol**, **catalysts** for)

L144 ANSWER 10 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1968:476637 HCAPLUS

DOCUMENT NUMBER: 69:76637

TITLE: **Mercaptans** and sulfides from alpha  
 olefins

INVENTOR(S): Kite, George F.

PATENT ASSIGNEE(S): Gulf Research and Development Co.

SOURCE: U.S., 5 pp.  
 CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1



## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
US 3397243	A	19680813	US 1965-478464	1965 0809

PRIORITY APPLN. INFO.:	US 1965-478464	A	1965 0809
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AB The title compds. are **prepared** by reacting an  $\alpha$ -olefin under anhydrous conditions with liquid **H<sub>2</sub>S** in the presence of an acyclic azo initiator and a finely-divided metal. The ratio of **mercaptans** to sulfides in the product is increased by the addition of a mono or bis(thiol ester) to the mixture. Thus, 1-octene, 1 mole % azodiisobutyronitrile, and 27% Ni charged into a 300-ml. autoclave, and **H<sub>2</sub>S** added until ratio of **H<sub>2</sub>S**-octene was 4:1. The autoclave was heated rapidly with vigorous stirring to 83° for 3 hrs. to give 99% mixture of 77% **mercaptans**, and 23% sulfides.

IT 7440-02-0, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, for **hydrogen sulfide**  
reaction with  $\alpha$ -olefins)

RN 7440-02-0 HCAPLUS

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IT 7783-06-4, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(with  $\alpha$ -olefins)

RN 7783-06-4 HCAPLUS

CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

INCL 260609000

CC 23 (Aliphatic Compounds)

ST **mercaptans** sulfides via olefins; sulfides  
**mercaptans** via olefins; olefins **mercaptans**  
sulfides via

IT **Catalysts**  
(2,2'-azobis[2-methylpropionitrile]-nickelas, for  
**hydrogen sulfide** reaction with  
 $\alpha$ -olefins)

IT **Thiols, preparation**  
RL: PREP (Preparation)  
(by **hydrogen sulfide** reaction with  
 $\alpha$ -olefins)

IT Olefins, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(with **hydrogen sulfide** of  $\alpha$ -)

IT 18496-25-8DP, Sulfide, dialkyl, preparation  
RL: PREP (Preparation)  
(by **hydrogen sulfide** reaction with  
 $\alpha$ -olefins)

IT 507-09-5, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from 2,2'-azobis[2-methylpropionitrile])

and nickel and, for **hydrogen sulfide**  
reaction with 1-octene)  
IT 110-05-4  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts** from nickel and, for **hydrogen**  
**sulfide** reaction with  $\alpha$ -olefins)  
IT 78-67-1 7440-02-0, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, for **hydrogen sulfide**  
reaction with  $\alpha$ -olefins)  
IT 111-66-0  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with **hydrogen sulfide**)  
IT 7783-06-4, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(with  $\alpha$ -olefins)

L144 ANSWER 11 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1968:59107 HCAPLUS

DOCUMENT NUMBER: 68:59107

TITLE: Ethyl **mercaptan prepared**  
from ethylene and **hydrogen**  
**sulfide**

INVENTOR(S): Constantinescu, Mircea; Constantinescu,  
Teodor; Fedin, Tamara

PATENT ASSIGNEE(S): Romania, Ministry of the Chemical Industry

SOURCE: Rom., 2 pp.  
CODEN: RUXXA3

DOCUMENT TYPE: Patent

LANGUAGE: Romanian

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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RO 44309		19661118	RO	1959 1229

AB New **catalysts** and an improved method of preparation were developed. **Catalysts** were made from powdered Fe, Co, or Ni nitrate, whose 20% solns. were impregnated on **Al2O3** powder at a ratio **Al2O3**-metal of 1.2:1 after drying; the mixture was dried at 110° and reimpregnated with a solution of 1% PtCl<sub>4</sub> or PdCl<sub>4</sub>, so that Pt or Pd content in **catalyst** was 0.5% after drying; the obtained dry powder was then pelletized. Over this **catalyst** was passed; e.g., a reactant gas of **H2S** and C<sub>2</sub>H<sub>4</sub> at a volume ratio of 1:1.23, at a space velocity of 20 hr.<sup>-1</sup>, at 230°, obtaining 67.3% EtSH. The apparatus is simple, working pressure is ambient, and **catalysts** are highly efficient.

IT 7783-06-4, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(addition reaction of, with ethylene, **catalysts** for)  
RN 7783-06-4 HCAPLUS  
CN Hydrogen sulfide (H<sub>2</sub>S) (8CI, 9CI) (CA INDEX NAME)

H<sub>2</sub>S

IT 7439-89-6, uses and miscellaneous 7440-02-0, ,  
uses and miscellaneous 7440-05-3, uses and miscellaneous  
7440-06-4, uses and miscellaneous 7440-48-4,  
uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)

(catalysts, for addition reaction of ethylene with  
hydrogen sulfide)

RN 7439-89-6 HCAPLUS  
CN Iron (7CI, 8CI, 9CI) (CA INDEX NAME)

Fe

RN 7440-02-0 HCAPLUS  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-05-3 HCAPLUS  
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS  
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-48-4 HCAPLUS  
CN Cobalt (8CI, 9CI) (CA INDEX NAME)

Co

IC C07C  
CC 23 (Aliphatic Compounds)  
ST SULFIDE ETHYLENE HYDROGEN; ETHYL MERCAPTAN PREPN  
; ETHYLENE HYDROGEN SULFIDE; HYDROGEN  
SULFIDE ETHYLENE; MERCAPTAN PREPN  
ETHYL  
IT Addition reaction **catalysts**  
(platinum metals-transition metals as, for ethylene with  
**hydrogen sulfide**)  
IT 7783-06-4, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(addition reaction of, with ethylene, **catalysts** for)  
IT 74-85-1, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(addition reaction of, with **hydrogen sulfide**,  
**catalysts** for)  
IT 7439-89-6, uses and miscellaneous 7440-02-0,  
uses and miscellaneous 7440-05-3, uses and miscellaneous  
7440-06-4, uses and miscellaneous 7440-48-4,  
uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(**catalysts**, for addition reaction of ethylene with  
**hydrogen sulfide**)  
IT 75-08-1P  
RL: PREP (Preparation)  
(manufacture of, from ethylene and **hydrogen**  
**sulfide**, **catalysts** for)

L144 ANSWER 12 OF 12 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1954:64082 HCAPLUS  
 DOCUMENT NUMBER: 48:64082  
 ORIGINAL REFERENCE NO.: 48:11306d-i,11307a-i,11308a  
 TITLE: Carbonylization I. Interaction of acetylene with carbon monoxide and compounds having a **reactive hydrogen** atom; synthesis of  $\alpha\beta$ -unsaturated carboxylic acids and their derivatives  
 AUTHOR(S): Reppe, Walter; Magin, A.; Schuster, C.; Keller, R.; Kroper, H.; Klein, T.; Kerckow, F. W.; v. Blank, G.; Merkel, K.; Scheller, H.; Weschky, L.; Wolff, K.; Schweckendiek, W.; Hecht, O.; Gassenmeier, E.; Simon, A.  
 CORPORATE SOURCE: Badische Anilin u. Sodafabrik, Ludwigshafen, Germany  
 SOURCE: Ann. (1953), 582, 1-37  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Unavailable  
 OTHER SOURCE(S): CASREACT 48:64082  
 GI For diagram(s), see printed CA Issue.  
 AB cf. Reppe, "Chemic u. Technik der Actylen-Druck Reaktionen," 2nd Ed. 1952. After an extensive discussion of the probable mechanism of the reaction between  $C_2H_2$  (I), CO, and compds. with active H atoms, the various techniques used are outlined. The so-called "stoichiometric method" (A) is carried out at 40-2° with 1 mol I, 1, mole  $H_2O$  (or ROH), 0.25 mol  $Ni(CO)_4$  (II), and 0.5 mol 40% HCl, with the residual air being replaced by N, giving 1 mol  $H_2C:CHCO_2H$  (III) (or the R ester), 0.25 mol  $NiCl_2$ , and 0.25 mol H [which is never found as free H, but reacts further with III (or its esters), giving compds. described below]. In the laboratory, A was a batch process, but formed the basis of a continuous technol. process. The equipment used is shown in a sketch, and both laboratory and com. processes are described in detail, often with rather wide variations. The following esters of III were **prepared** in very good yields by means of A: Me, b150 30°; Et b760 100°; Bu (IV), b760 144-5°;  $-(CH_2)_2-$  (V), b1-2 66-8°;  $-(CH_2)_4-$  (VI), b0.6 73-86°; glyceryl, b2-3 118°; tetrahydrofurfuryl (VII), b1.5 55-70°; decahydro-1-naphthyl, (VIII) b14 135-8°; and Ph (IX), b1.5 50-60°. (In a number of cases these and other derivs. were lost during World War II, before full purification and characterization could be effected). The Me ester of III formed azeotropic mixts. with  $H_2O$ ; byproducts of the reaction were small amts. of III,  $EtCO_2H$ , and in some cases  $EtCO_2Me$ . In **preparing** the Et ester, a byproduct (due to partial hydrogenation and polymerization) is probably  $MeCH:CHCH_2CO_2Et$ , b760 141-5°, giving an unsatd. acid,  $C_5H_8O_2$ , on saponification and forming  $Me(CH_2)_3CO_2Et$  on hydrogenation with Pd- $CaCO_3$ . Another product of the above reaction is an Et tetrahydrobenzoate, b760 193°, probably formed by a cyclizing polymerization involving 2 mol I and 1 mol III, with subsequent hydrogenation. Analyses of products from A included acid and saponification nos., ester number, and the "hydrogenation number" (i.e. the g. H added at the double bond by 10,000 g. of substance). Techniques for purifying products from A are described in detail. With AcOH in place of HCl in A, the following were **prepared**: (from  $MeC.tplbond.CC_6H_{13}$  and  $H_2O$ ), a mixture of  $MeCH:C(C_6H_{13})CO_2H$  and  $C_6H_{13}CH:CMeco_2H$ , b15 150-53°; (from I and decahydro-2-naphthol), VIII (polymerizing readily); (from butynol and  $H_2O$ ),  $MeC(OH):CMeco_2H$ , b1-2 113-15°; (from I and PhOH), IX; (from I and  $(CH_2OH)_2$ ), V; (from I and  $(CH_2CH_2OH)_2$ ), a mixture of VI and  $CH_2:CHCO_2(CH_2)_4OH$ , b5-6 80-115°; (from I and tetrahydrofurfuryl, alc.), VII. Another method of **prepn**. (B) involved the action of various **catalysts** on equimolar mixts. of I and CO at about 30 atmospheric in suitable autoclaves. Of the 48 possible **catalysts** studied, Ni salts alone or admixed with other compds. proved the most

satisfactory, although in many instances there occurred undesirable side reactions, that are discussed in detail.  $\text{NiBr}_2(\text{Ph}_3\text{P})_2\text{C}_4\text{H}_9\text{Br}$  (X), m.  $178^\circ$  (C.A. 43, 6202a) was a most effective **catalyst**, giving only about 5% of a mixture (XI) of byproducts. In the **preparation** of IV during the course of 37 days, 250 kg. BuOH containing 1.5% X and 1% BuBr was processed at  $175^\circ$  in a "V2A" high pressure tube with a 1:1 mixture of I and CO, at 30 atmospheric, giving a BuOH solution containing 53% IV and small amts. of XI; the latter (60% of which could be distilled) gave 15% of Bu-allylacetate, b<sub>8</sub>  $72-3^\circ$ , small amts. of Bu valerate, b<sub>8</sub>  $84-5^\circ$ , about 20% Bu butoxypropionate, b<sub>1</sub>  $90-1^\circ$  (identified after saponification as the Ag butoxypropionate), about 10% Bu fumarate b<sub>1</sub>  $122-3^\circ$ , and about 10% Bu tetrahydrophthalate, b<sub>1</sub>  $163-5^\circ$ . When, in method A,  $\text{Fe}(\text{CO})_5$  was substituted for II, and HCl, small amts. of p- $\text{C}_6\text{H}_4(\text{OH})_2$ , and some preformed ester of III were used, only about 28% III Et ester was obtained. Similarly, low yields of IV resulted. By modifying A (using AcOH, PhMe as solvent and 1-(1-naphthyl)-pyrrolidine or p- $\text{C}_6\text{H}_4(\text{OH})_2$  as polymerization inhibitors with the appropriate **mercaptan**), the following ill-smelling, easily polymerized esters of  $\text{H}_2\text{C}:\text{CHCOSH}$  were **prepared**: dodecyl b<sub>0.4</sub>  $121-33^\circ$ ; PhCH<sub>2</sub> b<sub>0.8</sub>  $94-103^\circ$ ; Ph b<sub>10</sub>  $150-80^\circ$ ; and p-MeC<sub>6</sub>H<sub>4</sub> b<sub>0.6</sub>  $89-94^\circ$ . Similarly HSCH<sub>2</sub>CO<sub>2</sub>H gave  $\text{H}_2\text{C}:\text{CHCOSCH}_2\text{CO}_2\text{H}$  b<sub>1.6</sub>  $100-20^\circ$  (decomposition). PhC.tplbond.CH and EtSH gave  $\text{H}_2\text{C}:\text{CPhCOSEt}$ , b<sub>1</sub>  $120-40^\circ$ . **H<sub>2</sub>S** with I and II gave the difficultly purifiable  $\text{CH}_2:\text{CHCOSH}$  (properties not given). By method A, with PhMe and HCl, I, II, and EtNH<sub>2</sub>, gave the dimer  $(\text{CH}_2:\text{CHCONHET})_2$  (XII), b<sub>9</sub>  $105-7^\circ$ ; similarly, BuNH<sub>2</sub> gave  $(\text{CH}_2:\text{CHCONHBu})_2$  (XIII), b<sub>1</sub>  $146-50^\circ$ . PhNH<sub>2</sub> (in H<sub>3</sub>PO<sub>4</sub>) gave the monomer  $\text{CH}_2:\text{CHCONHPh}$ , (XIV), m.  $101-2^\circ$ . Urea in AcOH gave an uncharacterized polymer; dicyclohexylamine (in AcOH and xylene) gave  $\text{CH}_2:\text{CHCON}(\text{C}_6\text{H}_{11})_2$ , b<sub>15</sub>  $196-206^\circ$  AcNH<sub>2</sub> in aqueous AcOH gave an (unanalyzed) compound b<sub>11</sub>  $200-20^\circ$ ; and pyrrolidine in AcOH gave the acrylopyrrolidide, b<sub>10</sub>  $106-8^\circ$ . By modifications of method B, the appropriate amines treated with I and CO (**catalysts** and solvents given in parentheses) yielded the following acrylamides: (NiI<sub>2</sub> SiO<sub>2</sub>-gel, and C<sub>6</sub>H<sub>6</sub>) XII; K<sub>2</sub>Ni(CN)<sub>4</sub>-SiO<sub>2</sub> and C<sub>6</sub>H<sub>6</sub>) XIII; (Ni(CN)<sub>2</sub> and p- $\text{C}_6\text{H}_4(\text{OH})_2$  in H<sub>2</sub>O)  $\text{CH}_2:\text{CHCONEt}_2$ , b<sub>3</sub>  $71^\circ$ , together with appreciable amts. of  $(\text{CH}_2\text{CONEt}_2)_2$ , b<sub>18</sub>  $186^\circ$  (NiI<sub>2</sub> and C, in PhMe) XIV; (NiI<sub>2</sub> and SiO<sub>2</sub> in xylene)  $(\text{CH}_2:\text{CHCONPh}_2)_n$ , b<sub>10</sub>  $190-210^\circ$ . To 950 g. MeCN, 50 g. H<sub>2</sub>O and 100 g. NiBr<sub>2</sub> was added with constant stirring a 1:1 mixture of I and CO at 20 atmospheric and this pressure maintained by further addns. over 50 h., giving 400 g. III, 130 g. anhydride of III, b<sub>10</sub>  $65-7^\circ$ , and 120 g. (low) polymers of III, together with an appreciable amount of a polymeric still residue. By a slightly modified method A, C<sub>6</sub>H<sub>13</sub>C.tplbond.CH in aqueous AcOH gave 1-octene-2-carboxylic acid, b<sub>0.6</sub>  $98-100^\circ$ , m.  $-6^\circ$  (Et ester, b<sub>10</sub>  $98-99^\circ$ ). Similarly from PhC.tplbond.CH with H<sub>2</sub>O, EtOH, and PhNH<sub>2</sub>, resp., were formed  $\text{CH}_2:\text{CPhCO}_2\text{H}$ , m.  $105^\circ$ , its Et ester, b<sub>17</sub>  $124-5^\circ$ , and its anilide, m.  $149-50^\circ$ . At  $50^\circ$ , 36 g. MeC.tplbond.CPh, 150 cc. Me<sub>2</sub>CO, 150 cc. H<sub>2</sub>O, 15 cc. AcOH, and 40 g. II gave a mixture of PhCH:CMeCO<sub>2</sub>H, m.  $74-8^\circ$ , and MeCH:CPhCO<sub>2</sub>H, m.  $129-30^\circ$ . Similarly, when EtOH was used, the products included the Et esters of these acids, and a still residue, which with aqueous NaOH, followed by acidification, gave an acid, b<sub>0.6</sub>  $131-2^\circ$ . PhC.tplbond.CPh, Me<sub>2</sub>CO, AcOH, H<sub>2</sub>O, and II gave trans-PhCH:CPhCO<sub>2</sub>H, m.  $172.5-3^\circ$  (after vacuum sublimation); Et ester, b<sub>1.2</sub>  $141-8^\circ$ . By method A, from  $\text{CH}_2:\text{CHC.tplbond.CH}$  under N with EtOH, HCl, and p- $\text{C}_2\text{H}_4(\text{OH})_2$  were formed (mainly) the dimer EtO<sub>2</sub>CC:CH.CH<sub>2</sub>.CH<sub>2</sub>CH[C(CO<sub>2</sub>Et):CH<sub>2</sub>].CH<sub>2</sub> (?) (XV) (analyses lost), b<sub>2</sub>  $135-7^\circ$ , as well as small amts. of a compound Cl<sub>2</sub>H<sub>16</sub>O<sub>4</sub>, m.  $110^\circ$ , presumably a monoester related to XV. Hydrogenation of XV (crude) with a Ni-Cr **catalyst** in MeOH gave the tetrahydro derivative of XV, b<sub>20</sub>

162-5° (fully analyzed). Inasmuch as no EtCHMeCO<sub>2</sub>H was formed in this reaction, it is probable that, in the **prepn** of XV, no stable monomer [CH<sub>2</sub>:C(CO<sub>2</sub>Et)CH:CH<sub>2</sub>] was formed.

IT 7440-02-0, Nickel

(salts, as **catalysts** in C<sub>2</sub>H<sub>2</sub> reaction with CO and alcs. or H<sub>2</sub>O)

RN 7440-02-0 HCAPLUS

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

CC 10 (Organic Chemistry)

IT **Catalysts**

(in acetylene reactions, with CO and alcs. or water, Ni salts as)

IT Nickel, compound with 1-bromobutane and Ph<sub>3</sub>P

(as **catalyst** in C<sub>2</sub>H<sub>2</sub> reaction with CO and alcs. or H<sub>2</sub>O)

IT Phosphine, triphenyl-, compound with NiBr<sub>2</sub>

(as **catalysts** in acetylene reaction with CO and alcs. or H<sub>2</sub>O)

IT 854458-40-5, Butane, 1-bromo-, compound with triphenylphosphine

878756-23-1, Butane, 1-bromo-, compound with NiBr<sub>2</sub>

(as **catalyst** in acetylene reaction with CO and alcs. or H<sub>2</sub>O)

IT 854458-40-5, Phosphine, triphenyl-, compound with 1-bromobutane

(as **catalysts** in acetylene reaction with CO and alcs. or H<sub>2</sub>O)

IT 105-75-9, Fumaric acid, dibutyl ester 492-38-6, Atropic acid

591-68-4, Valeric acid, butyl ester 1199-77-5, Cinnamic acid,

α-methyl- 1734-78-7, Cinnamic acid, α-methyl-, ethyl

ester 2051-76-5, Acrylic anhydride 2210-24-4, Acrylanilide

2274-11-5, Ethylene glycol, acrylate (di-) 2399-48-6, Furfuryl

alcohol, tetrahydro-, acrylate 2478-10-6, 1,4-Butanediol,

acrylates 2675-94-7, Acrylamide, N,N-diethyl- 3287-54-5,

2-Nonenoic acid, 2-methyl- 3618-41-5, Octanoic acid,

2-methylene-, ethyl ester 3760-10-9, Octanoic acid, 2-methylene-

4412-10-6, Crotonic acid, 2-phenyl- 4431-32-7, Malonic acid,

di-2-propynyl- 5459-38-1, Acrylin, tri- 19756-11-7, α-

**Toluenethiol**, acrylate 22286-82-4, Atropic acid, ethyl

ester 22692-57-5, Succinamide, N,N,N',N'-tetraethyl-

24446-63-7, Acrylic acid, 2,3-diphenyl-, ethyl ester 25999-14-8,

Acrylamide, N,N-dicyclohexyl- 32593-07-0, 2-Propenamide,

N,N-diphenyl-, homopolymer 40233-96-3, Crotonic acid, 2-phenyl-,

ethyl ester 42104-70-1, Pyrrolidine, 1-acryloyl- 61880-97-5,

Crotonic acid, 2-hexyl- 64859-23-0, Atropanilide 79663-99-3,

Cyclohexenecarboxylic acid, ethyl ester 86887-94-7, 1-

**Dodecanethiol**, acrylate 89463-77-4, Acetic acid,

**mercapto**-, ester with **thiolacrylic acid**

94400-15-4, **Benzenethiol**, acrylate 98694-27-0,

Cyclohexene-1,2-dicarboxylic acid, dibutyl ester 180526-05-0,

Crotonic acid, 3-hydroxy-2-methyl- 205812-71-1, Atropic acid,

**thiol**-, ethyl ester 205812-71-1, **Ethanethiol**,

atropate 833454-23-2, Cyclohexaneacetic acid,

3-carboxy-α-methyl-, diethyl ester 854721-10-1,

3-Cyclohexene-1-acetic acid, 3-carboxy-α-methylene-, ethyl

ester 856080-62-1, 1-Naphthol, decahydro-, acrylate

872827-92-4, p-**Toluenethiol**, acrylate

(preparation of)

IT 7440-02-0, Nickel

(salts, as **catalysts** in C<sub>2</sub>H<sub>2</sub> reaction with CO and alcs. or H<sub>2</sub>O)